

POPULAR SCIENCE

MECHANICS AND HANDICRAFT

July, 1950 • 25¢



Patching With a Brush - p.218



Making the Death Seat Safer

Arnold Brown

Leading Airlines

Use

CHAMPION

the World's Most Dependable
Spark Plug!



BE A CHAMPION DRIVER

—Follow These Rules To Stretch Tire Mileage.



Switching tires from one wheel to another in rotation prolongs their life by spreading wear evenly over five tires. Have your service man "criss-cross" your tires approximately every 6000 miles.



Inflation to correct pressure is the easiest and most important way to stretch tire mileage. Under inflation of 5 lbs. cuts tire life 32%—6 lbs., 39%—9 lbs., 52%. Check tire pressure once a week!



Only Champions have earned this stamp of public approval—America's Favorite Spark Plug. Be a Champion driver. Follow the experts like leading airlines and insist on dependable Champions.

CHAMPION SPARK PLUG COMPANY, TOLEDO 1, OHIO

Price Slashed in 1/2 to only \$1.95! and \$4.98



Get Started for a Big Pay Job with this **NEW ENCYCLOPEDIA OF MACHINE SHOP PRACTICE**

Thousands of Machinists Wanted! This One-Volume Reference Book and Reading Course Helps You Qualify—Quickly!

America's hugely expanded industries call for machinists and more machinists! Rates of pay were never higher! What an opportunity for men who like work that combines the skill of hands and brains! For such men anxious to get started in this profitable field, we offer the famed **NEW ENCYCLOPEDIA OF MACHINE SHOP PRACTICE**—the book which has started thousands on the road to big pay! . . . And we offer it at **HALF PRICE!** Not \$3.98 or \$4.98—but only \$1.95! **YOU SAVE** a full \$2.00 or \$3.00!

This amazing book shows you in almost 1,000 crystal-clear illustrations and easy-to-understand text exactly how every function of the machinist is performed! Written by practical experts in simple language so that even the beginner can make rapid progress; a ready reference work also for every machine operator, metal worker, draughtsman or mechanic.

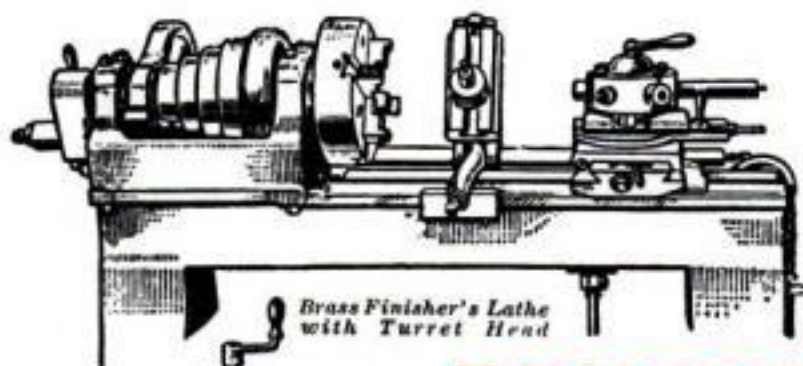
Describes and Illustrates Every Basic Machine Shop Operation

Covers every problem that confronts even the most expert machinist. Complete chapters devoted to every type of Bench Work; every type of Metal used by the machinist; Turret and Auto-

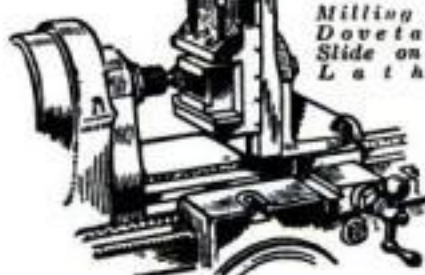
matic Lathes, their attachments and operations. Every type of Screw-Cutting; Tape-Turning; Knurling; Milling and Grinding.

**1000 "Show How" Pictures!
576 Pages!**

Included is full information on Special Machine Tools and Machine Attachments; Jigs and Fixtures; Punch Press Operations. Instruction in Heat-Treating of Metals; Welding and Soldering; Drop-Forging; Foundry Work; Gauging and Testing. All types of Calipers, Micrometers and other measuring instruments are included. Chapter on Reading Machine Blue Prints. Dozens of tables to simplify mathematical calculations. Edited by George W. Barnwell, Professor of Production Practice, Stevens Institute of Technology.



*Brass Finisher's Lathe
with Turret Head*



*Milling a
Dovetail
Slide on a
Lathe*

One of the many illustrations of Drill Grinding



EXAMINE IT FREE!

Imagine a work of this size, scope and importance offered at **HALF PRICE!** By ordinary price standards, it should sell for \$10.00! We've slashed the price—not to \$4.98, not \$3.98—but way down to only \$1.95! At this amazing bargain, books are going fast! So act at once. You need send no money now—just the coupon. Try it a full week—**FREE**—return it without further obligation if not delighted with this wonderful value!

© 1950 Wm. H. Wise Co., Inc., 50 West 47th Street, New York 19, N. Y.

MAIL THIS FREE-TRIAL COUPON NOW!

Wm. H. Wise & Co., Inc., 50 West 47th Street, New York 19, N. Y.
Without obligation to me, rush me immediately for Free Examination, a copy of the **NEW ENCYCLOPEDIA OF MACHINE SHOP PRACTICE**, 576 pages, nearly 1000 illustrations, bound in semi-flexible cloth. After a week's free trial, I will either return the book promptly and owe you nothing, or I will keep it and remit the amazingly low **HALF PRICE** of \$1.95, plus a few cents postage.

SAVE MORE! Send only \$1.95 with coupon and we will stand packing, shipping and insurance charges. Same return privilege and refund guaranteed.

Name.....

Address.....

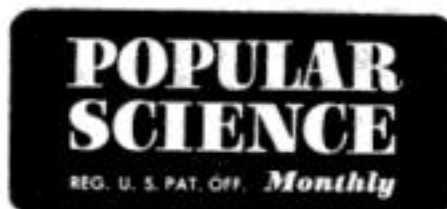
City..... Zone No. State.....

☐ Check here to examine **FREE** the De Luxe Edition, **THUMB-NOTCHED**, in Dupont, water resistant binding, easily cleanable, for only \$1.00 more. Same terms, return privilege.

105

807

Founded 1872. Vol. 157: No. 1



Mechanics and Handicraft

Perry Githens, EDITOR

Fred O. Newman, Volta Torrey, MANAGING EDITORS Howard C. Jensen, ART EDITOR

Harry Walton, MECHANICS & HANDICRAFT EDITOR

Hartley E. Howe, Frank Rowsome, Jr., ASSISTANT MANAGING EDITORS

ASSOCIATE EDITORS: Howard Allaway, Alden P. Armagnac, Devon Francis, Richard Giovine, Robert Gorman, Sheldon Gallager, Herbert Johansen, Martin Mann, Denis Sneigr, Robert P. Stevenson.

EDITORIAL ASSISTANTS: Julia Charnif, Carol Ennis, Rita K. Gilbert, Georgette Sparks, Harriet Trowbridge, Ruth Westphal.

STAFF PHOTOGRAPHERS: W. W. Morris (Chief), Hubert Luckett, Orlando Guerra (Darkroom).

ART DIRECTOR: Harry Samuels. ART ASSOCIATES: Herbert Anthony, Eric Karminski, Jr., Richard Meyer, Edward Hallstrom, Frances Cooper (Production).

WESTERN EDITOR: Andrew R. Boone (Los Angeles).

WASHINGTON EDITOR: John F. Loosbrock.

Features FOR JULY, 1950

Making the Death Seat Safer.....82

The Thin Man takes skull-cracking crashes to help scientists study what happens in auto smashups.

How to Put Old Engines to Work..160

There's a gold mine of useful power in the junk yard. Here are practical pointers on using it.

Atom Air Wardens' First Workout..96

When A-bomb's deadly radiation makes area too hot even for fire fighters, Geigermen lead way.

Gus Earns a Holiday.....170

After a day of fishing and a home-cooked meal, Gus solves the mystery of a knocking engine.

Harnessed Sunlight Grows Food....108

Ever heard of Chlorella? Someday you may be having it for supper.

Home Atom Labs Are Coming.....183

Secrets of nuclear physics can now be probed by Junior with new atom-lab toys that really work.

House Built Like a Log Cabin.....110

Pre-cut and packaged, streamlined version of a pioneer's cabin can be put up in a weekend.

Homes Improved with Concrete....188

Here's how you can build your own walks, steps, driveways, and pools with concrete.

Harvard Trains Pigeons.....116

Teaching birds to do tricks helps investigators find out why people behave the way they do.

Pocket Holds a 4-Tube Radio.....197

For your summer vacation, make this pocket-size superhet that picks up everything on the dial.

British Cars Are Different.....126

Cars with an English accent are invading U. S. highways. Here's the low-down on the Limeys.

Choosing Your Bearings.....204

An expert tells all about them—from wooden holes to tiny precision ball bearings.

Putting the Fire in Fireworks.....140

How fireworks are made that give you a thrilling but safer and saner Fourth of July sky show.

Giant Air Gun Jolt-Tests Fuses..... 94

Hydraulic Lift Added to Truck.....103

World's First Air Ferry for Cars.....104

Godfrey Hammond, PUBLISHER · Stephen P. Glennon, ADVERTISING DIRECTOR · Edward Roeder, Jr., ADVERTISING MGR.

EDITORIAL OFFICES: 353 Fourth Avenue, New York 10, N. Y. Manuscripts and illustrations submitted at regular rates should be so marked, addressed to "The Editors" and accompanied by stamped, self-addressed envelope. Popular Science Monthly exercises all possible care but assumes no responsibility for unsolicited material.

ADVERTISING OFFICES: NEW YORK—353 Fourth Avenue; CHICAGO—360 North Michigan Avenue; DETROIT—820 Book Building; SAN FRANCISCO—1003 TWA Building; PORTLAND (ORE.)—907 Terminal Sales Building; CLEVELAND—328 Citizens Building; LOS ANGELES—Granada Building.

Popular Science Monthly is published monthly at 353 Fourth Avenue, New York 10, N. Y., by Popular Science Publishing Co., Inc., Godfrey Hammond, President and Treasurer; R. C. Wilson, Raymond J. Brown, Stephen P. Glennon, Vice-Presidents; F. W. Briggs, Secretary. Entered as second-class matter Dec. 28, 1918, re-entered as second-class matter July 26, 1948, at the Post Office in New York, N. Y., under the act of March 3, 1879; additional entry as second-class matter at Dayton, Ohio. Entered as second-class matter at the Post Office Department, Canada. Printed in U.S.A. Copyright, 1950, by Popular Science Publishing Co., Inc. All rights reserved in the United States, Great Britain, and in all countries participating in the International Copyright Convention and Pan-American Copyright Convention. Yearly subscriptions to United States, its possessions and Canada, \$3.00 (2 years, \$5.50; 3 years, \$7.50); foreign countries \$1 per year extra. Subscribers must notify us of change of address four weeks before next publication date. Be sure to give both old and new addresses, including zone numbers. Vol. 157, No. 1.

HOW TO IMPRESS THE BOSS



Suppose you do prepare for advancement in your spare time. Can you be sure news of it will reach the right ears? Will your boss be impressed?

I. C. S. regularly reports the progress of its students to their employers, regularly receives letters expressing appreciation of this service.

Typical of the many letters is one from an executive of a well-known oil company: "We want to thank you for your progress report on the above-named employee. It may interest you to know that he is being promoted, effective immediately."*

YOU want your employer to know that you are ready for promotion. YOU want your training recognized and rewarded. Then act now to obtain that training. Sound, practical I. C. S. Courses cover more than 400 business and technical subjects. The coupon brings full information.

*Name furnished on request.

INTERNATIONAL CORRESPONDENCE SCHOOLS

APPROVED
under the
G.I. BILL

BOX 5657-M, SCRANTON 9, PENNA.

Without cost or obligation, please send me full particulars about the course BEFORE which I have marked X:

- | | | | |
|--|---|---|--|
| Business and Academic Courses
<input type="checkbox"/> Accounting <input type="checkbox"/> Advertising
<input type="checkbox"/> App. Psychology <input type="checkbox"/> Bookkeeping
<input type="checkbox"/> Business Administration
<input type="checkbox"/> Bus. Correspondence <input type="checkbox"/> Bus. Law
<input type="checkbox"/> Certified Public Accounting
<input type="checkbox"/> Commercial
<input type="checkbox"/> Commercial Art
<input type="checkbox"/> Cost Accounting
<input type="checkbox"/> Federal Tax
<input type="checkbox"/> First Year College
<input type="checkbox"/> Foremanship <input type="checkbox"/> French
<input type="checkbox"/> Good English <input type="checkbox"/> High School
<input type="checkbox"/> Higher Mathematics <input type="checkbox"/> Illustration
<input type="checkbox"/> Industrial Supervision
<input type="checkbox"/> Motor Traffic <input type="checkbox"/> Postal Civil Service
<input type="checkbox"/> Retailing <input type="checkbox"/> Retail Bus. Management
<input type="checkbox"/> Salesmanship <input type="checkbox"/> Secretarial
<input type="checkbox"/> Sign Lettering <input type="checkbox"/> Stenography
<input type="checkbox"/> Spanish <input type="checkbox"/> Traffic Management
Air Conditioning and Plumbing Courses
<input type="checkbox"/> Air Conditioning <input type="checkbox"/> Plumbing
<input type="checkbox"/> Heating <input type="checkbox"/> Steam Fitting
<input type="checkbox"/> Refrigeration | Chemical Courses
<input type="checkbox"/> Chemical Engineering
<input type="checkbox"/> Chemistry, Analytical
<input type="checkbox"/> Chemistry, Industrial
<input type="checkbox"/> Chemistry, Mfg. Iron & Steel
<input type="checkbox"/> Petroleum Refining <input type="checkbox"/> Plastics
<input type="checkbox"/> Pulp and Paper Making
Civil Engineering, Architectural and Mining Courses
<input type="checkbox"/> Architecture <input type="checkbox"/> Architectural Drafting
<input type="checkbox"/> Building Estimating
<input type="checkbox"/> Civil Engineering <input type="checkbox"/> Coal Mining
<input type="checkbox"/> Contracting and Building
<input type="checkbox"/> Highway Engineering
<input type="checkbox"/> Lumber Dealer
<input type="checkbox"/> Reading Structural Blueprints
<input type="checkbox"/> Sanitary Engineering
<input type="checkbox"/> Structural Drafting
<input type="checkbox"/> Structural Engineering
<input type="checkbox"/> Surveying and Mapping
Communications Courses
<input type="checkbox"/> Electronics
<input type="checkbox"/> Prac. FM and Television
<input type="checkbox"/> Prac. Telephony <input type="checkbox"/> Radio Operating
<input type="checkbox"/> Radio, General <input type="checkbox"/> Radio Servicing
<input type="checkbox"/> Telegraph Engineering | Electrical Courses
<input type="checkbox"/> Electrical Drafting
<input type="checkbox"/> Electrical Engineering
<input type="checkbox"/> Electric Light and Power
<input type="checkbox"/> Lighting Technician
<input type="checkbox"/> Practical Electrician
<input type="checkbox"/> Power House Electric
<input type="checkbox"/> Ship Electrician
Internal Combustion Engines Courses
<input type="checkbox"/> Auto Technician <input type="checkbox"/> Aviation
<input type="checkbox"/> Diesel-Electric
<input type="checkbox"/> Diesel Engines <input type="checkbox"/> Gas Engines
Mechanical Courses
<input type="checkbox"/> Aeronautical Engineer's, Jr.
<input type="checkbox"/> Aircraft Drafting <input type="checkbox"/> Flight Engineer
<input type="checkbox"/> Forging <input type="checkbox"/> Foundry Work
<input type="checkbox"/> Heat Treatment of Metals
<input type="checkbox"/> Industrial Engineering
<input type="checkbox"/> Industrial Instrumentation
<input type="checkbox"/> Industrial Metallurgy
<input type="checkbox"/> Machine Shop
<input type="checkbox"/> Machine Shop Inspection
<input type="checkbox"/> Mechanical Drafting
<input type="checkbox"/> Mechanical Engineering | <input type="checkbox"/> Mold-Loft Work
<input type="checkbox"/> Patternmaking—Wood, Metal
<input type="checkbox"/> Reading Shop Blueprints
<input type="checkbox"/> Sheet-Metal Drafting
<input type="checkbox"/> Sheet-Metal Worker <input type="checkbox"/> Ship Drafting
<input type="checkbox"/> Ship Fitting <input type="checkbox"/> Tool Designing
<input type="checkbox"/> Toolmaking <input type="checkbox"/> Welding Engineering
<input type="checkbox"/> Welding—Gas and Electric
Railroad Courses
<input type="checkbox"/> Air Brake <input type="checkbox"/> Car Inspector
<input type="checkbox"/> Diesel Locomotive
<input type="checkbox"/> Locomotive Engineer
<input type="checkbox"/> Locomotive Fireman
<input type="checkbox"/> Locomotive Machinist
<input type="checkbox"/> Railroad Section Foreman
<input type="checkbox"/> Steam and Diesel Loco. Eng.
Stationary Engineering Courses
<input type="checkbox"/> Boilermaking
<input type="checkbox"/> Combust. Engrg. <input type="checkbox"/> Engine Running
<input type="checkbox"/> Marine Engineering
<input type="checkbox"/> Power Plant Engr. <input type="checkbox"/> Steam Engineer
Textile Courses
<input type="checkbox"/> Cotton Manufacturing <input type="checkbox"/> Loom Fixing
<input type="checkbox"/> Rayon Weaving <input type="checkbox"/> Textile Designing
<input type="checkbox"/> Woolen Manufacturing |
|--|---|---|--|

Name _____ Age _____ Home Address _____

City _____ State _____ Working Hours _____ A.M. to _____ P.M.

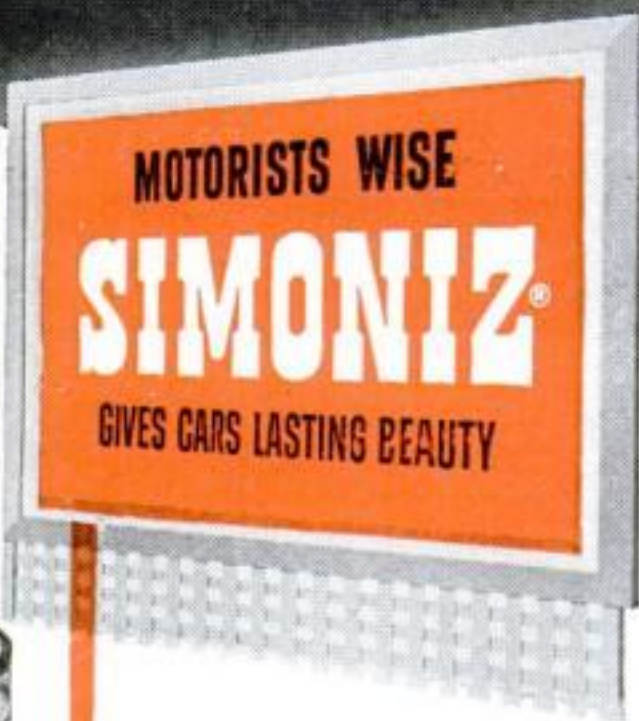
Present Position _____ Employed by _____

Length of Service
in World War II _____

Enrollment under G.I. Bill approved for World War II Veterans. Special tuition rates to members of the Armed Forces.
Canadian residents send coupon to International Correspondence Schools Canadian, Ltd., Montreal, Canada.

WHY WASTE TIME

with "temporary polishes?"



SIMONIZ GIVES TWICE THE SHINE AND IT LASTS!

Newer cars need only Simoniz to clean and beautify the finish... a single, simple operation. On older cars, first use Simoniz Kleener (Liquid or Paste) to clean the finish. Then Simoniz for lasting beauty.

Long lasting Simoniz saves time and effort...really protects and preserves the finish...keeps colors from fading! Your car will stay brighter than new with Simonizing—the Deluxe Beauty Treatment.

THE SIMONIZ COMPANY, CHICAGO 16, ILL.

Car Tilted for Easier Servicing.....	115
Putting the Heat on Hot Cargoes.....	119
How Meter Keeps Tabs on Water.....	120
Golf Balls Get Built-In Zip.....	123
Here's the New Ford Transmission.....	133
Three-Dimensional TV in Atom Lab.....	134
Model T Comes to Life as Hot Rod.....	136
New Auto Shower Sprays Car Clean.....	138
Solved: Early-American Brick Mystery..	146
World's First Turboprop Flying Boat....	150
Germany Produces 48-Hp. Car.....	156
Look What They Used to Hang on Cars..	164
Why Auto Styles Have Changed.....	166

Mechanics & Handicraft

You Can Build a Turn Signal.....	168
This Table Cost Only \$6.50.....	177
Plastic Bricks Make Partitions.....	180
How to Turn a Door Around.....	192
Aluminum Strips Make Splash Rails.....	209
Build a Case for Your Camera.....	212
You Can Take Shade With You.....	215
Make That Toy Really Sail.....	216
Metal Patched With a Brush or Knife....	218
Shop Table Handles Many Jobs.....	222

Departments

Letters	8
New Ideas from the Inventors.....	91
Aids to Modern Living.....	154
Keeping the Home Shipshape.....	157
Hints from the Model Garage.....	175
I'd Like to See Them Make.....	179
New Shop Ideas.....	200
What's Wrong?.....	202
Craftsmen at Work.....	224
Mechanics of Farming.....	228
New Tools.....	242
P.S. Last Minute News and Notes.....	246

Build a Family Theater in Your Living Room

IF THE radio, phonograph, and TV set in your home have been bought piecemeal, chances are your living room has a hodgepodge of cabinets connected by a rat's nest of wires. At least that's the way it was with Dick Prentice, until his wife began to holler. What the outcome was, and what they cooked up between them, is shown on eight unusual pages in our August issue. Since you don't have to be an amateur Chippendale to do it yourself, you won't want to miss this story.



Recorded only in the distortion-free *quality zone*, music "comes alive" on RCA Victor 45-rpm records.

*What **magic number** makes music mirror-clear?*

Now, for more than a year, music-lovers have had—and acclaimed—RCA Victor's remarkable 45-rpm record-playing system. Already, millions know "45" as the magic number that makes music mirror-clear.

As was said when the American Society of Industrial Engineers presented RCA Victor with its 1950 Merit Award, "We are moved to admiration by your bold departure from past practices in developing a completely inte-

grated record and record-player system."

Research leading to "45"—confirmed at RCA Laboratories—covered 11 years ... and resulted in small, non-breakable records which can be stored by hundreds in ordinary bookshelves, yet play as long as conventional 12-inch records. The automatic player, fastest ever built, changes records in less than 3 seconds—plays up to 50 minutes of glorious music at the touch of a button! Every advantage of convenience and cost, marks "45" as the ideal system!

Another great RCA development is the finest long-play record (33 $\frac{1}{3}$ -rpm) on the market—for your enjoyment of symphonies, concertos, and full-length operas. Radio Corporation of America, Radio City, N. Y. 20.



Fully automatic RCA Victor 45-rpm record player and records—small enough to hold in one hand ... inexpensive enough for any purse.



RADIO CORPORATION of AMERICA

World Leader in Radio — First in Television

It Takes More Than Talk

...To solve our national security problems.
We need men of action—"double-duty" Americans
—willing to make a personal contribution
to our nation's strength.


Francis W. McGovern is such a man. A hard working
fireman for the N. Y. C., he still finds time to train
with the 721st Railway Operating Battalion,
U. S. Army Organized Reserve Corps.

This summer, he is spending two weeks with his
battalion insuring its immediate effectiveness
in case of emergency.

He and thousands of other Army Reservists are
quietly, seriously undergoing peacetime training as
their contribution to a strong, free, and
peaceful America.

Find out more about your Army's Organized Reserve
Corps at your nearest U. S. Army and U. S. Air Force
Recruiting Station or write directly to the
Executive for Reserve and ROTC Affairs, Dept. of
the Army, Pentagon, Washington 25, D. C.

CPL. MCGOVERN CLIMBING ABOARD AN ARMY LOCOMOTIVE AT FT. EUSTIS, VA.



★
**ORGANIZED
RESERVE CORPS**
★
U.S. ARMY





IF you're that man, here's something that will interest you.

Not a magic formula—not a get-rich-quick scheme—but something more substantial, more practical.

Of course, you need something more than just the desire to be an accountant. You've got to pay the price—be willing to study earnestly, thoroughly.

Still, wouldn't it be worth your while to sacrifice some of your leisure in favor of interesting home study—over a comparatively brief period? Always provided that the rewards were good—a salary of \$3,000 to \$10,000?

An accountant's duties are interesting, varied and of real worth to his employers. He has *standing*!

Do you feel that such things aren't for you? Well, don't be too sure. Very possibly they *can* be!

Why not, like so many before you, investigate LaSalle's modern Problem Method of training for an accountancy position?

Just suppose you were permitted to work in a large accounting house under the personal supervision of an expert accountant. Suppose, with his aid, you studied accounting principles and solved problems day by day—easy ones at first—then more difficult ones. If you could do this—and could turn to him for advice as the problems became complex—soon you'd master them all.

That's the training you follow in principle under the LaSalle Problem Method.

Over 2800 Certified
Public Accountants among
LaSalle alumni

You cover accountancy from the basic Principles right up through Accountancy Systems and Income Tax Procedure. Then you add C. P. A. Training and prepare for the C. P. A. examinations.

As you go along, you absorb the principles of Auditing, Cost Accounting, Business Law, Statistical Control, Organization, Management and Finance.

Your progress is as speedy as you care to make it—depending on your own eagerness to learn and the time you spend in study.

Will recognition come? The only answer, as you know, is that success *does* come to the man who is really *trained*. It's possible your employers will notice your improvement in a very few weeks or months. Indeed, many LaSalle graduates have paid for their training—with increased earnings—before they have completed it! For accountants, who are trained in organization and management, are the executives of the future.

Write For This Free Book

For your own good, don't put off investigation of *all* the facts. Write for our free 48-page book, "Accountancy, The Profession That Pays." It'll prove that accountancy offers brilliant futures to those who aren't afraid of serious home study. We'll also include "Ten Years' Promotion in One"—a book which has helped many men. Send us the coupon *now*.

**LASALLE EXTENSION
CHICAGO 5, ILL.**

Other LaSalle Opportunities

- ☐ Higher Accountancy
- ☐ C.P.A. Coaching
- ☐ Bookkeeping
- ☐ Law: LL.B. Degree
- ☐ Business Management
- ☐ Salesmanship
- ☐ Traffic Management
- ☐ Foremanship
- ☐ Industr'l Management
- ☐ Stenotypy
(Machine Shorthand)

LASALLE EXTENSION UNIVERSITY A CORRESPONDENCE INSTITUTION

417 S. Dearborn St. Dept. 783-HR Chicago 5, Ill.

I want to be an accountant. Send me without obligation, "Accountancy, the Profession that Pays" training program—also "Ten Years' Promotion in One."

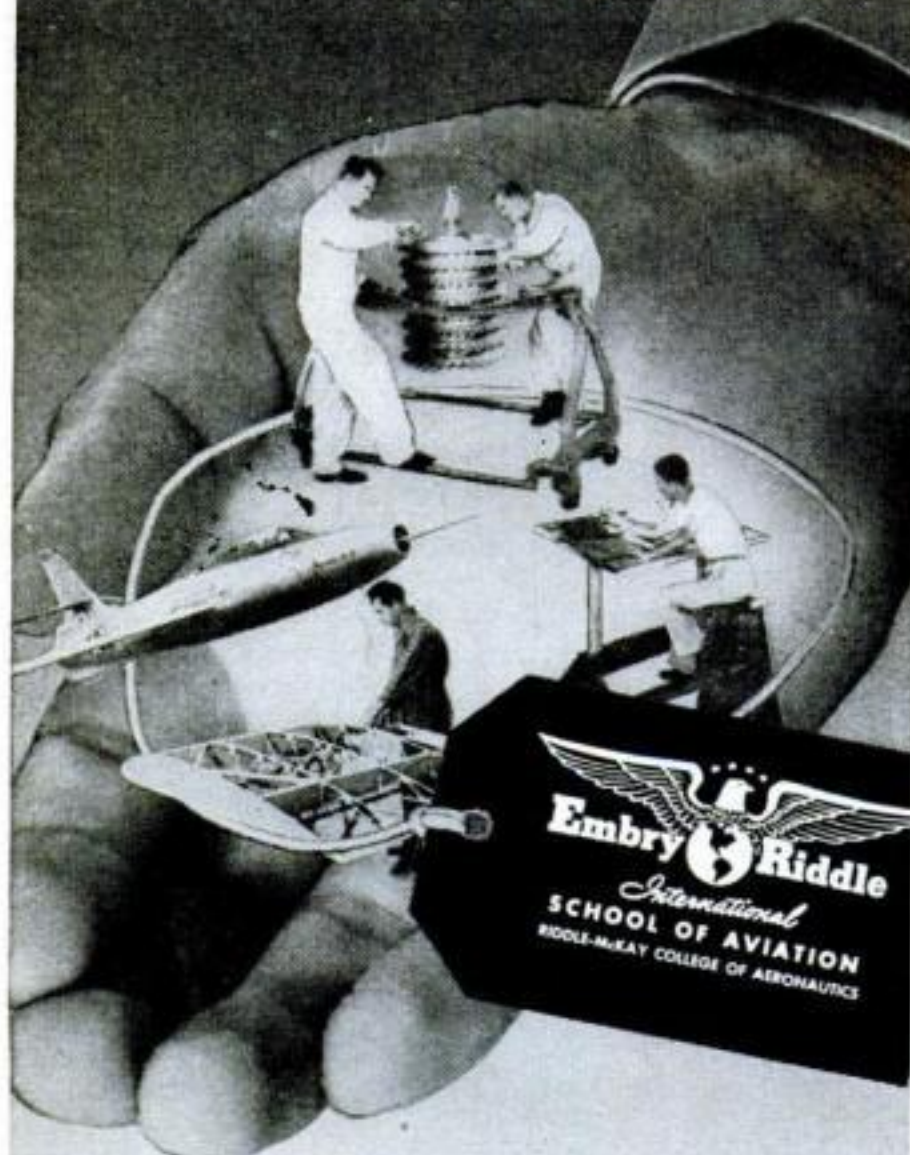
Name.....Age.....

Address.....

City, Zone & State.....



Your Success in Aviation begins at Embry-Riddle



There's a bright future ahead for you in Aviation. In fact, no other career field today can possibly offer you so much opportunity. The aviation industry urgently needs men with skilled minds and hands to build, fly and maintain the giant aircraft of this great new Air Age.

The properly trained man climbs faster and higher in Aviation, just as in any other profession. That's why we say your aviation success begins at Embry-Riddle. For Embry-Riddle offers you the matchless advantage of knowledge and experience gained over a quarter-century of specialized aviation training.

In a few short months Embry-Riddle prepares you for engineering, master mechanic, flight or combined pilot and mechanic positions. All courses stress thorough, practical study including work on live aircraft in Embry-Riddle's airline-size hangars.

Enjoy Florida's unexcelled year-'round climate, its wealth of aviation and recreational facilities. Live, work and play on Embry-Riddle's modern campus — the most complete aviation school plant in America. Save time, earn good money faster...send coupon today for full information.

Dean of Enrollments - Dept. 93
Embry-Riddle School of Aviation
Miami 30, Florida

Please Print

NAME _____

ADDRESS _____

City _____

State _____ Age _____

I am interested in...

- ☐ A.&E. Mechanic
- ☐ Commercial Pilot
- ☐ Engineering
- ☐ A.&E. Combined Commercial Pilot
- ☐ Flying Mechanic
- ☐ Drafting & Design

Check One ☐ Veteran ☐ Non-Vet

TRAIN IN MIAMI--AIR CAPITAL OF THE WORLD

Letters



What's That Smell?

Sir:

I wonder if you could help settle an argument that has arisen among a group of us here at the University of Tennessee. We have been trying to figure out just what makes a new car smell new! I know it sounds ridiculous, but we still haven't found a satisfactory answer.

We thought perhaps it was some chemical in the lacquer, or a composite of several; but my chemist friends know these chemicals and haven't been able to identify that



distinctive odor. Someone suggested that the upholstery was chemically treated, and one man attributed the smell to a sound-deadening paste sprayed into the material under the roof of the car.

Can you give us an expert answer?

WILLIAM J. STARR

Knoxville, Tenn.

There are only two major causes of new-car smell: rubber cement, used in installing cloth and fabric trim, and the rubberized metal-sealing compound used to embed windshield and back-window assemblies in their openings and to waterproof all metal-to-metal joints. There are now on the market at least two chemical perfumes, or "reodorants," for spraying in used cars to make them smell like new.

Why Rockets Come Back

Sir:

An interesting question is raised by the picture in your April issue [p. 170] of a switch that took a ride in a Wac Corporal rocket that soared beyond the earth's atmos-

DRAW ME!



Copy this girl and try for

\$1,275.00 In Prizes!

5 PRIZES! 5 Complete \$255 Art Courses, including Drawing Outfits!

Here's your big chance, if you want to become a commercial artist, designer, or illustrator! An easy-to-try way to win **FREE** art training!

Whether you win or not our instructors send you their comments on your work, if

your drawing shows promise! Trained illustrators and artists now making big money. Find out now if **YOU** have profitable art talent. You've nothing to lose—*everything to gain*. Start your drawing now. Mail it today.

Amateurs Only! Our students not eligible. Make copy of girl 5 ins. high. Pencil or pen only. Omit the lettering. All drawings must be received by Sept. 30, 1950. None returned. Winners notified.

Latest Winner List! Free course winners in previous contest—from list just released: Mrs. E. Eaton, Rt. 5, Coshocton, Ohio; Mrs. L. Webster, 259 Beechwood, Princess Anne, Md.; G. Ratzmer, 1468 Highland, Lakewood, Ohio; C. Faiello, Box 188, Magnolia, Ohio; U. Bahan, 5249A Devonshire, St. Louis, Mo.

Art Instruction, Inc.

MINNEAPOLIS • NEW YORK
CHICAGO • LOS ANGELES
MEMBER NATIONAL HOME STUDY COUNCIL

ART INSTRUCTION, INC., Dept. 7140
500 S. 4th St., Minneapolis 15, Minn.

Please enter my attached drawing in your
September drawing contest. **(PLEASE PRINT)**

Name _____ Age _____

Address _____ Phone _____

City _____ Zone _____ County _____

State _____ Occupation _____

JULY 1950 9



The Dark Continents of Your Mind

DO YOU struggle for balance? Are you forever trying to maintain *energy, enthusiasm, and the will to do?* Do your personality and power of accomplishment ebb and flow—like a stream controlled by some unseen valve? Deep within you are minute organisms. From their function spring your emotions. They govern your *creative ideas and moods*—yes, even your enjoyment of life. Once they were thought to be the mysterious seat of the soul—and to be left unexplored. Now cast aside superstition and learn to direct intelligently these *powers of self*.

Accept this Free Book

Let the Rosicrucians, an age-old fraternity of thinking men and women (not a religion), point out how you may fashion life as you want it—by making the fullest use of these little-understood *natural faculties* which you possess. This is a challenge to make the most of your heritage as a human. Write for the Free Book, "The Mastery of Life." Address: Scribe S.L.Y.

The ROSICRUCIANS

San Jose

(AMORC)

California

phere to a record height of 250 miles above White Sands, N. M.

According to accepted theory, this earth has a peripheral speed of 1,000 miles an hour due to its easterly rotation, plus an orbital speed of some 66,000 m.p.h. around the sun, and is supposed to go forward with the sun toward the constellation Hercules at an estimated speed of 45,000 m.p.h.

Heretofore, when the question has been asked as to why an object leaving the earth does not show some movement to the west, the stock answer has been that the earth carries its atmosphere with it. But when a rocket reaches the rare atmosphere at 250 miles above the earth, there should be sufficient lag to cause a westward movement such as that observed in pictures of a spiral nebula.

Is not the lagless climb and fall of this rocket the first proof that, actually, the earth has little if any movement?

CHARLES W. WARD

Bradenton, Fla.

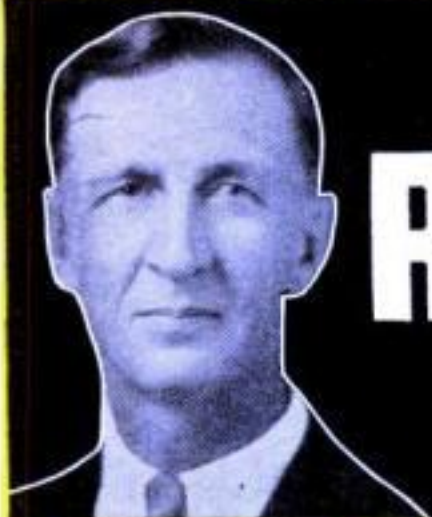
Answer: No.

A rocket standing on the ground prior to launching is at rest with respect to the earth and is, therefore, partaking of the earth's motion—that is, traveling east at a speed of 750 m.p.h., the earth's rotational surface velocity at the latitude of White Sands. The mere fact that the rocket is propelled vertically to a high altitude does not destroy this easterly velocity. Therefore, the rocket remains more or less straight above the take-off point in both its upward and downward flight. And it, or any surviving fragment, falls near the launching site.

Secrecy vs. Security

Sir:

Your articles in recent months on military tactics and equipment have been highly interesting. However, I believe they are too detailed for public presentation. I believe that a specialist in military equipment may be able to deduce more from the given information than is safe. It is conceivable that a potential enemy of the United States might be able to develop preventive measures from deductions based on this type of article. Since the world situation is at this moment so very tense, I believe that it would be better to discontinue articles of



BE A SUCCESS AS A RADIO-TELEVISION TECHNICIAN

**TWO
FREE BOOKS
SHOW HOW
MAIL COUPON**

*America's Fastest Growing Industry
Offers You...*

I TRAINED THESE MEN AT HOME



"Today I am considered an expert Radio-Television Technician. Have four employees. Business has doubled." — PAUL MILLER, Toledo, Ohio.

"Am Broadcast Engineer for Station KROP. Fundamentals of Radio learned in N. R. I. invaluable." — JERRY COLLETT, Brawley, California.



"For the past five years, I have been averaging \$15 and up a week repairing Radios in my spare time." — STANLEY GENTON, Cincinnati, Ohio.

"Since I finished your course, have been busy repairing Radios, installing Television. It's the coming business." — V. MARCHE-SANI, Philadelphia, Pa.



"After finishing course, opened my own repair shop. Can't praise your training too high." — ERNEST T. SLATE, Corsicana, Texas.

1. EXTRA MONEY IN SPARE TIME

As part of my servicing course, I send you SPECIAL BOOKLETS starting the day you enroll that show how you can make \$5, \$10 or more a week EXTRA fixing neighbors' Radios in spare time while learning. Tester you build with parts I send helps.

2. GOOD PAY JOB

Your next step is a good job installing and servicing Radio-Television sets, or becoming boss of your own Radio-Television Sales and Service Shop, or getting a good job in a Broadcasting Station. In 1945, there were 943 Radio Stations. Today, about 2,700 are on the air! Result—thousands of qualified men stepped into good jobs. Then add developments in FM, Two-Way Radio, Police, Aviation, Marine, Micro-wave Relay Radio. Think what this means! New jobs, more jobs, good pay for qualified men.

3. BRIGHT FUTURE

And think of the opportunities in Television. Only 19 Stations were on the air in 1947. Today, more than fifty. And the experts say there will be over 1,000 within three years. Manufacturers are producing over 100,000 Television sets a month. Be a successful Radio-Television Operator or Technician... get in line for success and a bright future in America's fastest growing industry!



I Will Train You at Home You Practice Servicing or Communications with MANY KITS

I've trained hundreds of men with no previous experience to be successful TECHNICIANS. I will train you, too. Or now you can enroll for my NEW practical course in Radio-Television Communications. Train for your FCC operator's or technician's license. You learn Radio-Television theory from clear, illustrated lessons in my tested home study courses.

As part of both my Servicing and Communications course, I send you MANY KITS of modern equipment that "bring to life" theory you learn.



You Build This MODERN RADIO

As part of my Servicing course, I send you speaker, tubes, chassis, loop antenna, transformer, EVERYTHING you need to build this modern Radio. Use it to conduct many valuable tests and practice servicing. It's yours to keep.

You Build This TRANSMITTER

As part of my New Communications course, I send parts to build this low-power broadcasting Transmitter that shows how to put a station "on the air." Perform procedures demanded of Broadcast Station operators, conduct many tests, experiments. It's yours to keep.



Building circuits, conducting experiments with them, introducing and repairing defects, gives you valuable, practical experience. (Some of the equipment you get is shown below.) Everything I send is yours to keep.

Mail Coupon for Books FREE

Coupon entitles you to ACTUAL LESSON on Radio Servicing with many pictures and diagrams plus my 64-page book, "HOW TO BE A SUCCESS IN RADIO-TELEVISION" both FREE. See what my graduates are doing and earning. Send coupon today. J. E. SMITH, President, Dept. OGP-3, National Radio Institute, Pioneer Home Study Radio School, Washington 9, D. C.

VETERANS

**GET THIS TRAINING
UNDER G. I. BILL.
MAIL COUPON NOW.**

Good for Both—FREE

**MR. J. E. SMITH, President, Dept. OGP-3
National Radio Institute, Washington 9, D. C.**

Mail me Sample Lesson and 64-page Book about How to Win Success in Radio-Television—both FREE. (No salesman will call. Please write plainly.)

Name..... Age.....

Address.....

City..... Zone..... State.....

☐ Check if Veteran

Approved Under G. I. Bill



*Make \$20 to
\$30 a Week*

**EXTRA
MONEY**



MACHINE SAW FILING PAYS UP to \$2 or \$3 an HOUR

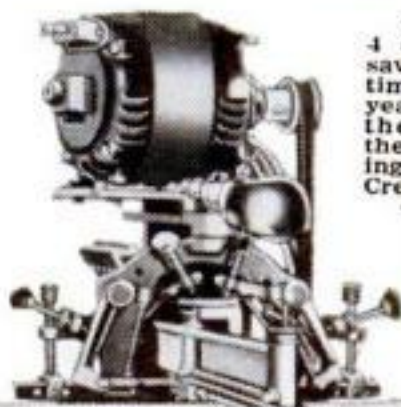
• Turn your spare time into CASH—sharpening saws with a Foley Automatic Saw Filer pays up to \$2 or \$3 an hour. You will find you can make \$20 to \$30 a week in your spare time as a starter.

You can work in your basement or garage—no experience necessary. "The first saw I sharpened with my Foley Filer came out 100%"—writes Clarence E. Parsons. No canvassing—"I advertised in our local paper and got in 93 saws"—says M. L. Thompson. The Foley is the only machine with which you can file all hand saws, also band saws and cross-cut circular saws.

SEND FOR FREE BOOK "INDEPENDENCE AFTER 40"!

Shows how you can get business from home owners, farmers, carpenters, schools, factories, etc. With a small investment, no overhead, no stock of goods to carry, you can get right into a cash business—and possibly later on develop into a full-time repair shop. Send coupon today for Free Book. No salesman will call.

"Each saw I filed got me six more and business has been picking up that way since a year ago. If it keeps up I will have to buy another Foley Saw Filer." William C. Baldwin



"I have done 4 or 5 thousand saws in my spare time in the 4 1/2 years since I got the outfit, and they are all coming back." Len Crego

"Have filed over 2200 saws in 18 months. One customer always brings another." E. A. Fink



SEND COUPON FOR FREE BOOK

**FOLEY MFG. CO., 719-O Foley Bldg.
Minneapolis 18, Minnesota**

Send FREE BOOK—
"Independence After 40."

Name.....
Address.....

this sort, even if it meant keeping the public in ignorance of the technological advancements being made.

LOTHAR GOTTLIEB

New York, N.Y.

PS concedes that it is necessary, in the present state of the world, to keep certain details of U.S. military equipment secret. What those are we leave to the authorized judges, by adhering strictly to the security regulations of the armed forces and the Atomic Energy Commission.

But our country's future security, we believe, depends not merely on keeping old ideas locked up. Just as important is keeping ahead of rivals in generating new ones for tomorrow—by the customary process of rubbing today's ideas together. To stop that, by "keeping the public in ignorance," seems to us the greater risk to our security—and our democracy.

Model A(2)

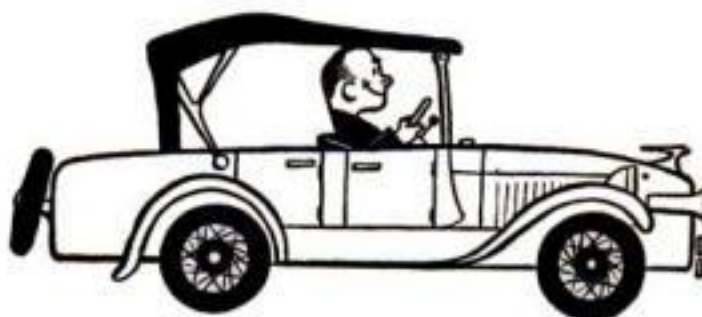
Sir:

I want to second the motion of reader Albert A. Johnson [PS, May, p. 16] that the Ford people resume making their famed Model A to meet the need for a low-priced really practical car.

But I don't agree that they should "not change a single nut or bolt." There are three necessary changes that should be made to fit today's conditions: (1) hydraulic brakes, (2) gear shift on steering column, (3) modernized body.

L. G. POLLOCK

Wood, S. D.



Proposed: A PS Quiz

Sir:

Many of your articles are just as educational as any high school text book. So why not run a short test or series of questions over each of your more important articles? A person could obtain a pretty good education just from reading your magazine if you

Prepare in our
Big Training
Shops for these

GREAT OPPORTUNITY FIELDS!

TELEVISION
AND RADIO OR ELECTRICITY

This big fire-proof
building is occupied
entirely by Coyne.

FIVE BIG FLOORS PACKED WITH MASSIVE EQUIPMENT

Thousands of men and young men have come to our big training shops where we have floor upon floor packed with massive equipment. Here they prepare for good jobs and real futures in the opportunity fields of Television-Radio and Electricity. For many years, these fields have offered great opportunities to trained men. With new developments, including Electronics and Television, they will continue to grow and offer even greater opportunities. Why be satisfied with a "no future" job? Many "one operation" jobs that exist today will not last. Prepare for a good job with a real future for steady pay and advancement by training NOW in the great training shops of COYNE in Chicago.

NOT "HOME-STUDY" COURSES

Our famous Television-Radio Practical-Technical method gives you practical experience on a massive outlay of equipment. Not by correspondence, but actual shop work plus necessary technical training. You are trained right here in the great Coyne shops that have been training men and young men for over 50 years.

TELEVISION-RADIO ELECTRICITY

A great field now, even greater growth ahead. Here at COYNE you're trained for Construction, Testing, Trouble-Shooting on Radio, Public Address, Sound Units. Training includes FM, Television Servicing, etc. Many Coyne trained men in good jobs or own well paying Television-Radio businesses of their own.

INCLUDING INDUSTRIAL ELECTRONICS

Big future in Power Plant Work, Motors, Armature Winding, Home and Factory Wiring, Appliances, Refrigeration, Maintenance, Illumination, etc. Electricians are in demand everywhere—lifetime job service to Coyne graduates. Send for BIG FREE BOOK.

ELECTRIC REFRIGERATION

This valuable training now available with either course means added opportunities.

G. I. APPROVED

NON-VETERANS who are short of cash can finance most of their tuition and pay in easy monthly payments. Many earn while learning.

B. W. COOKE, President

COYNE ELECTRICAL AND
TELEVISION-RADIO SCHOOL
500 So. Paulina St., Dept. BO-73H, Chicago 12, ILL.

LARGEST, OLDEST, BEST EQUIPPED SCHOOL OF ITS KIND IN THE U.S.

Mail Coupon for Big FREE Book!

Whether you prefer Television-Radio or Electricity, train on actual equipment at Coyne. We have a big, fully illustrated book on each course, and we'll send you the one you want, or both if you want to consider both fields, without obligation. Mail coupon—TODAY.



B. W. COOKE, President
COYNE ELECTRICAL AND TELEVISION-
RADIO SCHOOL 500 S. Paulina St.,
Dept. BO-73H, Chicago 12, Ill.

Send me the book, checked below and details of
your training offer. This does not obligate me and
no salesman will call.

☐ TELEVISION-RADIO ☐ ELECTRICITY

NAME.....

ADDRESS.....

CITY..... STATE.....

WHAT EVERY AUTO MECHANIC WANTS TO KNOW



This Big Practical Book gives full information with working diagrams covering the principles, construction, ignition, service and repair of modern cars, trucks and buses.

Diesel Engines, Hydramatic and Fluid Drives Fully Explained.

A complete Guide of 1800 pages, with over 1500 illustrations showing inside views of the working parts, with instructions for service jobs.

IT PAYS TO KNOW

How to fit pistons—How to locate engine knocks—How to fit connecting rod bearings—How to service main bearings—How to re-condition valves—How to time valves—How to adjust fan belts—How to adjust carburetors and

chokes—How to rebuild a clutch—How to service automatic transmissions—How to service brakes—How to adjust steering gear—How to cope with ignition troubles—How to service distributors—How to time ignition—How to "tune up" an engine.

\$4 COMPLETE • PAY \$1 A MO. TO GET THIS ASSISTANCE FOR YOURSELF SIMPLY FILL IN AND MAIL COUPON TODAY.



Step up your own skill with the facts and figures of your trade. Audels Mechanics Guides contain Practical Inside Trade Information in a handy form, Fully Illustrated and Easy to Understand. Highly Endorsed. Check the book you want for 7 DAYS FREE EXAMINATION. Send No Money, Nothing to pay Postman.

CUT HERE MAIL ORDER



Check NOW!

You Can Look Over Any Guide In Your Own Home

Start the Easy Payments If Satisfied

MAIL THIS TODAY



AUDEL, Publishers, 49 W. 23 St., NEW YORK 10, N. Y.

Please send me postpaid for FREE EXAMINATION books marked (x) below. If I decide to keep them I agree to mail \$1 in 7 Days on each book or set ordered and further mail \$1 monthly on each book or set until I have paid price, otherwise I will return them.

- | | |
|---|-----|
| <input type="checkbox"/> AUTO MECHANICS GUIDE, 1800 pages . . . | \$4 |
| <input type="checkbox"/> DIESEL ENGINE MANUAL, 400 Pages . . . | 2 |
| <input type="checkbox"/> WELDERS GUIDE, 400 Pages . . . | 1 |
| <input type="checkbox"/> MACHINISTS Handy Book, 1600 Pages . . . | 4 |
| <input type="checkbox"/> POWER PLANT ENGINEERS Guide, 1500 Pages. . . | 4 |
| <input type="checkbox"/> ENGINEERS & FIREMANS EXAMS, 528 Pages. . . | 1 |
| <input type="checkbox"/> PUMPS, Hydraulics & Air Compressors, 1658 Pgs. . . | 4 |
| <input type="checkbox"/> MARINE ENGINEERS Handy Book, 1280 Pages . . . | 4 |
| <input type="checkbox"/> ENGINEERS & Mechanics Guides (8 Book Set). . . | 12 |
| <input type="checkbox"/> Answers on Practical ENGINEERING, 254 Pages . . . | 1 |
| <input type="checkbox"/> ELECTRIC WIRING DIAGRAMS, 210 Pages . . . | 1 |
| <input type="checkbox"/> ELECTRICIANS EXAMINATIONS, 250 Pages. . . | 1 |
| <input type="checkbox"/> ELECTRICAL DICTIONARY, 9000 Terms . . . | 2 |
| <input type="checkbox"/> ELECTRIC MOTOR GUIDE, 1000 Pages . . . | 4 |
| <input type="checkbox"/> HANDY BOOK OF ELECTRICITY, 1440 Pages . . . | 4 |
| <input type="checkbox"/> ELECTRICAL POWER CALCULATIONS, 425 Pgs. . . | 2 |
| <input type="checkbox"/> RADIOMANS GUIDE, 975 Pages . . . | 4 |
| <input type="checkbox"/> ELECTRONIC DEVICES, 216 Pages . . . | 2 |
| <input type="checkbox"/> ELECTRIC LIBRARY, 7000 Pages (12 Book Set). . . | 18 |
| Vols. I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII \$1.50 Ea. | |
| <input type="checkbox"/> OIL BURNER GUIDE, 384 Pages . . . | 1 |
| <input type="checkbox"/> HOUSE HEATING GUIDE, 1000 Pages . . . | 4 |
| <input type="checkbox"/> CARPENTERS & Builders Guides (4 Book Set). . . | 6 |
| <input type="checkbox"/> PLUMBERS & Steamfitters Guides (4 Book Set). . . | 6 |
| <input type="checkbox"/> MASONS & Builders Guides (4 Book Set). . . | 6 |
| <input type="checkbox"/> BLUE PRINT READING, 416 Pages . . . | 2 |
| <input type="checkbox"/> PAINTERS & DECORATORS MANUAL, 450 Pgs. . . | 2 |
| <input type="checkbox"/> GARDENERS & GROWERS Guides (4 Book Set). . . | 6 |
| <input type="checkbox"/> REFRIGERATION & Air Conditioning, 1280 Pgs. . . | 4 |
| <input type="checkbox"/> SHEET METAL WORKERS Handy Book, 388 Pgs. . . | 1 |
| <input type="checkbox"/> SHEET METAL PATTERN LAYOUTS, 1100 Pgs. . . | 4 |
| <input type="checkbox"/> AIRCRAFT WORKER, 240 Pages . . . | 1 |
| <input type="checkbox"/> MECHANICAL DRAWING GUIDE, 160 Pages. . . | 1 |
| <input type="checkbox"/> MECHANICAL DRAWING & DESIGN, 480 Pgs. . . | 2 |
| <input type="checkbox"/> MATHEMATICS & CALCULATIONS, 700 Pgs. . . | 2 |
| <input type="checkbox"/> MECHANICAL Dictionary, 968 Pages . . . | 4 |
| <input type="checkbox"/> MILLWRIGHTS & Mechanics Guide, 1200 Pgs. . . | 4 |

Name _____

Address _____

Occupation _____

Employed by _____

33

did something like that to encourage him to study it carefully.

HUBERT McCALLUM

Houston, Tex.

How many other readers would like an occasional PS Quiz?

Puzzle Solution

Sir:

I'm puzzled by one thing in that picture of the self-winding Swiss car clock shown on page 130 of your May issue. The clock is mounted on the steering wheel of what appears to be a 1949 or '50 Oldsmobile. But the figures on the speedometer, visible through the wheel, run up to 180 miles an hour!

RICHARD BOYLE

Athens, O.

Looks impossible to me; since I own the same type of Oldsmobile, with speedometer dial reading only up to 110.

NORMAN FOURNER

Lewiston, Me.

Wha' hopen?

DONALD HARVEY

Goshen, N.Y.

To the dozens of sharp-eyed PS readers who spotted this detail:

The photo, like the clock, was made in Switzerland—where distances are measured, not in miles, but in kilometers. At .6214 miles to the kilometer, 180 kilometers equals about 112 miles.

Automatic Drives

Sir:

Just a line to let you know that your April story on automatic transmissions—and a good one it is!—has attracted attention here.

Knowing your sincere desire for accuracy, though, I want to offer a small correction in the Box Score on page 105:

Ultramatic Drive is standard equipment on Packard custom models and available at extra cost (\$185, including Federal excise taxes) on all other cars in our 1950 line.

SYDNEY J. KEITH

Packard Motor Car Co.,
Detroit, Mich.



INVENTORS



Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

The Patent Laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent, in order to comply with the requirements of the Patent Laws. For that reason, unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and are prepared to serve you in the handling of your patent matters.

A specially prepared booklet entitled "Patent Guide for the Inventor", containing detailed information with respect to patent protection and procedure, together with a "Record of Invention" form will be promptly forwarded to you without obligation upon request.

CLARENCE A. O'BRIEN & HARVEY JACOBSON

Registered Patent Attorneys

02-G DISTRICT NATIONAL BUILDING

WASHINGTON 5, D. C.



JULY 1950 15



NOW! YOU CAN EASILY Fix ANY Car IN LESS TIME... and do a better job too!



BRAND-NEW Edition of Famous
MoToR's Manual Shows You How
To Repair — Quickly and
Easily—Any Car Built from
1935 THROUGH 1950!

**FREE
7-DAY
TRIAL**

NO job is too tough when
you've got MoToR's
brand-new **AUTO REPAIR
MANUAL**. Shows how to
save work on "ornery" jobs.
Helps you make **MORE
MONEY** by doing more

jobs in less time! Now covers 1950
models; up-to-date information on
all new automatic transmissions
and carburetors.

**COMPILED FROM 150 OFFICIAL
FACTORY SHOP MANUALS!**

This great book—750 BIG 8½"x11"
pages — brings you the complete
"dope" from 150 Official Factory
Shop Manuals, boiled down in simple
easy-to-understand language. 2100
cut-away photos, diagrams, draw-
ings show **WHAT** to do, **HOW** to do
it. 200,000 service and repair facts!
741 car models! Now **YOU** can try
it **FREE**—for 7 days.

SEND NO MONEY

Mail coupon below — *without
money!* When your book ar-
rives—*make it show you what
it's got!* Unless you agree it's
the greatest time and work
saver you've ever seen—return
book in 7 days, pay nothing.
Mail coupon **NOW!** MoToR
Book Department, Desk 2H,
250 West 55th Street, New
York 19, N. Y.

**COVERS ANY CAR
BUILT SINCE 1935!**

Auburn	Kaiser
Austin	Lafayette
Bantam	La Salle
Buick	Lincoln
Cadillac	Mercury
Chevrolet	Nash
Chrysler	Oldsmobile
Cord	Packard
Crosley	Pierce
De Soto	Arrow
Dodge	Plymouth
Ford	Pontiac
Frazer	Reo
Graham	Studebaker
Hudson	Terraplane
Hupmobile	Willis

**Same FREE Offer On
MoToR's Truck and
Tractor Manual**

BRAND-NEW! Covers **EVERY**
job on **EVERY** popular make
gasoline truck, tractor, stock
engine made from 1936 thru
1949. 961 big
pages, 300,000
facts, 1400
pictures.
Check
proper box
in coupon.
**FREE 7-Day
Trial.**



MAIL COUPON NOW FOR 7-DAY FREE TRIAL

MoToR BOOK DEPT.
Desk 2H, 250 W. 55th St., New York 19, N. Y.

Rush to me at once (check box opposite book you want):
☐ **MoToR's New AUTO REPAIR MANUAL.** If O.K., I will
remit \$1 in 7 days (plus 35c delivery charges). \$2 monthly
for 2 months and a final payment of 95c one month after that.
Otherwise I will return the book postpaid in 7 days. (Foreign
price, remit \$8 cash with order.)
☐ **MoToR's New TRUCK & TRACTOR REPAIR MANUAL.**
If O.K., I will remit \$2 in 7 days, and \$2 monthly for 3
months, plus 35c delivery charges with final payment. Otherwise
I will return book postpaid in 7 days. (Foreign price, remit \$10
cash with order.)

Print Name.....Age

Address

CityState

☐ Check box and save 35c delivery charge by enclosing **WITH**
coupon entire payment of \$5.95 for Auto Repair Manual (or \$8
for Truck and Tractor Repair Manual.) Same 7-day return-refund
privilege applies.

PRINT YOUR OWN POST CARDS

**COMPLETE
OUTFIT
only
\$7.50**



Amazing results in sales, inquiries and con-
tacts... saves time and money... very easy
to use **GEM STENCIL DUPLICATOR** is
ideal for Advertising, Announcements, Notices,
Labels, Forms, Price Lists—hundreds of uses for
every type of business and organization.
Comes complete with all supplies, instructions
and 60-page Book of Ideas.

FREE TRIAL OFFER: Try it before you
buy it! Write and a **GEM OUTFIT** will be
sent you postpaid. After 10 days, send only
\$7.50 or return the GEM, no questions asked.
The GEM must sell itself; you be the judge.

BOND EQUIPMENT CO. • Dept. 151
6633 Enright • St. Louis 5, Mo.

SEND NO MONEY • FREE TRIAL OFFER



LEARN AERONAUTICAL ENGINEERING

Aircraft and Engine Mechanics (A&E)

Train at the Flying Wing school—New classes
starting soon. Write for illustrated catalog.

Northrop Aeronautical Institute

APPROVED FOR VETERANS DIVISION OF NORTHROP AIRCRAFT, INC.
1525 E. Broadway, Hawthorne, Los Angeles County, California

LEARN IN SPARE TIME— by Easy PICTURE CARTOONING CHART METHOD!

Same Simplified Method that has helped
train creators of "Steve Canyon," "Winnie
Winkle," "Out Our Way," "Secret Agent
X-9," "The Neighbors," "Reg'lar Fel-
lers," "Strange As It Seems," and many
others. Send 10c for Picture Chart (to test
your ability), and full details. (State age.)

LONDON SCHOOL OF CARTOONING
5027 Cleve. Transit Bldg., Cleveland 14, Ohio



LEARN TO HYPNOTIZE



Yes, anyone. Modern speed hypnotism.
Methods revealed. You are shown exactly
what to say and do. Many interesting ex-
periments. Self-hypnosis is fully explained.
Amazing results. Detailed hypnotic tests
given. Learn this exciting fascinating art.
Hold your friends spellbound. Have fun.

Send for
"HYPNOTISM REVEALED" — \$1
12" Phonograph Record Inducing Self-Hyp-
nosis plus Individual & Group-Hypnotism **\$5**

MELVIN POWERS, Professional Hypnotist, 1324 Wilshire, Dept. 60, Hollywood 17, Calif.

TRAINED MEN

win the good jobs in industry

● Prepare for a good-paying job! Franklin Technical Institute
will prepare you for an engineering or technical position. More
than 50,000 graduates—many are important supervisors.

Practical two-year day courses in industrial electricity and
electronics, industrial chemistry, mechanical and machine de-
sign, structural design and architectural drafting, automotive
service and management, electric wiring and maintenance. One-
year professional photography courses. Also preparatory and
evening courses. Approved for veterans. Coeducational. Founded
by bequest of Benjamin Franklin. 42nd year.

Plan now to acquire the training which you need
to get ahead. Write for catalog today!



FRANKLIN TECHNICAL INSTITUTE
39 Berkeley Street Boston 16, Mass.

INVENTORS

If you believe that you have an invention, you should find out how to protect it. The first step is to have a search made of the prior pertinent U. S. patents. If a report on this search indicates that the invention appears patentable you can apply for a patent, and the specifications and claims should be prepared.

The firm of McMorrow, Berman & Davidson, with offices in Washington, D. C., is qualified to take the necessary steps for you. We can make a preliminary search on your invention, advise you whether we think it can be patented, and prepare your application for patent.

Unless you are fully familiar with the U. S. Patent Laws, we recommend that you engage the services of a Registered Patent Attorney to protect your interests. The patent laws are *your* laws. A patent gives you the right to prevent others from making, using or selling the invention claimed in your patent for a period of 17 years.

Use these patent laws for your protection. Investigate whether your invention can be patented. If you have what you believe to be an invention, we suggest that you have this firm make a search for you.

Send for a copy of our Patent Booklet entitled "How To Protect Your Invention," containing information about patent protection and patent procedure. Along with this we will also send you an "Invention Record" form, for your use in writing down and sketching details of your invention. We will mail them promptly. No obligation. They are yours for the asking.

McMORROW, BERMAN & DAVIDSON

Registered Patent Attorneys

PATENTS • COPYRIGHTS • PATENTS

142-D VICTOR BUILDING, WASHINGTON 1, D. C.

Which of these 2 one time WEAKLINGS PAID only a Few Cents to become an All-Around HE-MAN at Home?



Which One Paid Hundreds Of Dollars To Train At My Side? Rex Ferris, was a skinny weakling, paid a few cents to start building into a Champion All Around He Man! Larry Campbell paid me hundreds of dollars to train at my side years ago. Start to become an All-Around He Man at home with these same secrets for only a few cents—like Rex Ferris did!

Amazing get-acquainted offer—YOURS for only

10c

INSTEAD OF \$1 FOR ALL 5 COURSES Plus FREE Photo Book!

"The Jowett System is the greatest in the world!" says R. F. Kelly, Physical Director, Atlantic City

Be a Winner at Anything YOU Tackle with Progressive Power SPORTS! JOB! SCHOOL! FRIENDS!

Let's Go, Pal! I'll prove I can make YOU an

"ALL-AROUND" HE-MAN

FAST — OR NO COST! says George F. Jowett World's Greatest Body Builder

Enjoy My "Progressive Power" Strength Secrets! Give Me 10 Easy Minutes a Day —Without Strain!

I'll teach you the "Progressive Power Method" through which I rebuilt myself from a physical wreck the doctors condemned to die at 15, to the holder of more strength records than any other living athlete or teacher! "Progressive Power" has proven its ability to build the strongest, handsomest men in the world. And I stand ready to show you on a money back basis—that no matter how flabby or puny you are, I can do the same for you right in your own home. Let me prove I can add inches to your arms, broaden your shoulders, give you a man-sized chest, powerful legs and a Rock-like back—in fact, power pack your whole body so quickly it will amaze you! Yes, I'll jam you with power and confidence to master any situation—to win popularity—and to get ahead on the job! Through my proven secrets I bring to life new power in you inside and out, until YOU are fully satisfied you are the man you want to be.

PROVE IT TO YOURSELF IN ONE NIGHT

Send only 10c for my 5 easy-to-follow, picture-packed courses now in 1 complete volume "How to Become a Muscular He-Man." Try it for one night! Experience the thrilling strength that surges through your muscles. 10 DAY TRIAL! Think of it—all 5 famous courses in one picture-packed muscle-building volume only 10c. You must actually FEEL results in ONE WEEK, or your money will be promptly refunded!

FREE!



George F. Jowett

Whom experts call "Champion of Champions"

• World's wrestling and weight lifting champ at 17 and 19.
• World's Strongest Arms. • 4 times World's Perfect Body—plus other records.

FREE GIFT COUPON!

Jowett Institute of Physical Culture Dept. PS-07 230 Fifth Avenue, New York 1, N. Y.

Dear George:—Please send by return mail, prepaid, FREE Jowett's Photo Book of Strong Men, plus all 5 Muscle Building Courses. 1. Molding a Mighty Chest. 2. Molding a Mighty Arm. 3. Molding a Mighty Grip. 4. Molding a Mighty Back. 5. Molding Mighty Legs—Now all in One Volume "How to Become a Muscular He-Man." Enclosed find 10c for postage and handling. No C.O.D.'s.

George F. Jowett Champion of Champions

Name.....Age.....

Address.....

City.....Zone & State.....

5 YEAR WRITTEN GUARANTEE BULOVA 15 & 17 JEWEL MOVEMENT

ONLY \$16.95 Plus \$1.70 Tax

Originally \$59.50 Sold up to

Also

- Benrus
- Gruen
- Waltham or
- Elgin Watches

Choice \$16.95



Genuine Bulova, Benrus, Gruen, Waltham, Elgin and other famous wrist watches in latest style Yellow Gold Cases. You get these unredeemed 5-year guaranteed lifetime quality FAMOUS MAKE

WATCHES now at truly enormous savings because we bought out SURPLUS STOCKS of leading New York and Maryland Jewelers. Order now while they last. State make preferred. Order men's or ladies'.

TRIAL OFFER! WEAR AT OUR RISK! Money back in 5 days if not delighted! SEND ONLY \$1 down payment with order. Pay balance to postman on arrival plus postage. Or we pay postage if you enclose \$16.95, plus \$1.70 tax.

FREE! HANDSOME EXPANSION BAND INCLUDED WITH PREPAID ORDERS. Order now!

MARYLAND DISTRIBUTORS, Dept. 103 501 E. Baltimore St. Baltimore 2, Md.

Free Folder: America's Best Watch and Diamond Ring Values. Practically Wholesale Prices to User Direct.

15 or 17 JEWEL WRIST WATCHES

Water-resist. Shock-protected with Swiss Precision Movement

Originally \$30

OUR PRICE NOW

\$9.95

Plus \$1 Tax

LEARN UPHOLSTERING

A money-making business or side line. Practical home training. Low cost, easy terms. You get professional upholsterer's tools; also materials to make and upholster a fine Ottoman with your lessons. Write or send penny postcard today for FREE ILLUSTRATED BOOKLET.

WEST COAST UNIVERSITY, Extension Dept. PS 70

1601 S. Western Ave.

Los Angeles 6, Calif.

REAL ESTATE BE A BROKER

PAYS BIG! SEND FOR FREE, BIG, ILLUSTRATED CATALOG NOW! No obligation. Graduates report making substantial incomes. Start and run your own business quickly. Men, women of all ages, learn easily. Course covers Sales, Property Management, Appraising, Loans, Mortgages, and related subjects. STUDY AT HOME or in our classrooms in big cities. Diploma awarded. G.I. approved. Nationally known.

WEAVER SCHOOL OF REAL ESTATE (Est. 1936)

15 E. Pershing Road, Dept. PS, Kansas City, Mo.

FREE BOOK TELLS HOW

Look —a 10 1/2 x 4, 6-ply Tire. Tube, Machined Wheel and Bearing at a "give away" price. Supplied in two types:—

1. With Highspeed TIMKEN BEARING (with Grease Retainer) \$8.95
2. With Slowspeed NEEDLE BEARING (with Grease Retainer) \$5.95

Freight Collect (8 1/2 lb.)

Ideal for Handcarts, Bgies, Trailers, Soapbox Racers, etc. A bargain from the world's largest stock of all types of Airplane Tires. Send your check or money order to:

Airplane Tire Co., 93 Hiway, Tulare S., California



WHAT IS YOUR IDEA OF A GOOD JOB?

Do you want independence... good pay... a chance to become one of your town's most respected citizens? Would you like to know that your skill is your security as long as you live? These are a few of the advantages of Watchmaking, the mechanical profession that has been called "depression-proof" by unbiased national authorities.

Don't wait for "breaks" that never come; learn the facts now about real opportunities ahead for our skilled graduates. Our 32-page catalog will tell you all about outstanding GI-approved courses in master watchmaking, chronograph watch repair and jewelry engraving. Write today!

WESTERN PENNSYLVANIA HOROLOGICAL INSTITUTE, INC.

Desk 39, 706 Smithfield St.

Pittsburgh 19, Pa.



Get
Into

TELEVISION, RADIO ELECTRONICS

Master ALL Phases

Get Complete Training. You Receive and Keep All Tubes, Equipment, Parts and Lessons. No Extra Charges.

GOOD PAY and Unlimited Opportunities in JOBS LIKE THESE:

Business of Your Own
Radio Manufacturing, Sales, Service
Broadcasting Telecasting
Television Manufacturing,
Sales, Service
Laboratories: Installation, Maintenance of Electronic Equipment,
Electrolysis, Call Systems
Garages: Auto Radio Sales, Service
Sound Systems and Telephone Companies; Oil Well and Drilling
Companies; Engineering Firms
Theatre Sound Systems Police Radio
And scores of other good jobs
in many related fields

YOU CONDUCT MANY EXPERIMENTS LIKE THESE!

Checking action of condensers
Experiments with AF and RF Amplifiers
Experiments with resonance
Producing beat frequencies
Calibrating oscillators
Experiments with diode, grid-bias, grid-leak and infinite impedance detectors
Practical experience in receiver trouble shooting
Application of visual tester in checking parts and circuits
Experiments with audio oscillators
Advanced trouble-shooting
... and many, many others

Complete Training by Practical Resident Trade School, Est. 1905

The same highly trained faculty, instruction materials and methods used here in our large, modern resident school, are adapted to your training in your own home. Shop Method Home Training has been proved by hundreds of successful graduates.

**Both Resident and Home Study
Courses Offered**

YOU LEARN BY DOING

You receive special laboratory experiment lessons to show you how to build with your own hands various experimental units such as those shown at left, and how to conduct many tests.



**YOU RECEIVE THIS
PROFESSIONAL MULTITESTER
YOU BUILD ALL THESE AND
MANY OTHER UNITS WITH
PARTS WE SEND YOU!**



Signal Generator



Audio
Oscillator



T.R.F.
Receiver

You Build This
Superheterodyne



**You Receive a Special Series
of Modern Lessons in TELE-
VISION, all a part of your
course; you master all phases.**

You will find all lessons easy to understand because they are illustrated throughout with clear diagrams and step-by-step examples that you work out yourself. Every piece of the equipment and complete lesson material we send you is yours to keep and enjoy, including the multitester, experimental equipment, all parts of the Superheterodyne, tube manual, radio dictionary, and complete, modern Television texts. All parts are standard equipment.

Shop Method Home Training . . . Earn While You Learn

With our practical resident Shop Method Home Training, you study in your spare time. You receive Spare Time Work Lessons, which show you how to earn while you learn. Service neighbors' radios and TV receivers, appliances, etc., for extra money and experience. Many National students pay all or part of their training with spare time earnings!

**DON'T DELAY! The Radio-Television
Industry needs trained men NOW!**

**APPROVED
FOR
VETERANS!**
Check coupon below!

For quick action,
mail coupon
today and we'll
rush you full in-
formation.

Free!

**NEW, ILLUSTRATED
OPPORTUNITY
BOOK AND SAMPLE
LESSON SHOW YOU
HOW WE TRAIN
YOU . . . SEND FOR
THEM TODAY! NO
COST. NO
OBLIGATION.**



NATIONAL SCHOOLS

LOS ANGELES 37, CALIF. • EST. 1905

FIND OUT NOW . . . MAIL COUPON TODAY

National Schools, Dept. PS-7
4000 South Figueroa Street
Los Angeles 37, California

Send me your FREE book "Your Future in Radio" and the sample lesson of your course. I understand no salesman will call on me.

NAME _____ AGE _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

☐ Check here if Veteran of World War II

Mail in envelope
or paste on
penny postal.

PYROIL

IS A

LIFE PRESERVER

FOR YOUR CAR!

You can preserve the life of your car with Pyroil. With Pyroil, your motor oil will adhere to metal surfaces assuring lubricated "starts" that prevent excessive wear. Pyroil provides added protection against corrosion, gum and sludge deposits. Preserve the life of your car with Pyroil. Ask your gas station attendant to add Pyroil and add miles to your car.

Pyroil for Aircraft Engines

Use Aircraft Pyroil B for lubricating oil, Aircraft Pyroil A for gasoline.

GIVEN! An attractive Pyroil metal savings bank—takes coins up to 50c pieces. **MOTORISTS**, it's yours for the asking—sent postage paid.

Manufactured and Guaranteed by
PYROIL COMPANY,
495 Main Street
La Crosse, Wisconsin.
Canadian Distributors:
Central Purchasing Agencies, Ltd.
Toronto, Ontario



PYROIL COMPANY
495 Main Street, La Crosse, Wisconsin

I want my car to last and run properly. Please tell me more about Pyroil and how it can accomplish this for me.

Name.....

Address.....

City or Town..... State.....



FREE

A NEW HOME INDUSTRY

Let us show you how extremely easy and PROFITABLE it is to make beautiful and useful things out of **LIQUID PLASTICS, LIQUID MARBLE, LIQUID IVORY, LIQUID GLASS, CERAMICS, ETC.**... as easy as pouring water out of a glass! Make novelties, jewelry, gifts, art-ware, toys, tools, dies, gadgets, ceramics... a million useful things! We supply everything—**MATERIALS, INSTRUCTIONS and BUYERS!** Send only 25c for 1. Big catalog of 300 casting materials, molds and accessories, 2. A beautiful **CASTING** free (to show you what you can do), and 3. Actual **INSTRUCTIONS** on how to cast and start in the **CASTING BUSINESS!** VALUABLE MOLDS given **FREE** with orders! Send 25c today—this may be the lucky coin that will start the most fascinating and profitable phase of your life.

PLASTICAST COMPANY (DEPT. A)
170 N. Halsted St. (Write to nearest address) P. O. Box 987
Chicago 6, Ill. Palo Alto, Calif.
CANADIAN CUSTOMERS, please order directly from: **CANADIAN INDUSTRIAL PLASTICS, LTD.**, 1056 1/2 Pender West, Vancouver, B.C.

Learn CARPENTRY BRICK LAYING

Get into the billion dollar building trades. Learn now while opportunities are greatest. Train in our completely equipped shops under expert instructors. G.I. Approved. Enroll now. Limited Classes. Write for **FREE** catalog.

MIDWEST SCHOOL OF BUILDING TRADES, Dept. PS-7
411 N. Center St. Bloomington, Ill.



BIG-MONEY PROFESSION FOR YOU

EARN IN FULL OR SPARE TIME LEARN AT HOME

Large incomes in Scientific Swedish Massage, working for doctors, hospitals, sanitariums, clubs or in your own private practice. Hydrotherapy and Electrotherapy included in easy-to-learn course. Prepare for Diploma and Security in this interesting and profitable field. Write for facts and Success Book—**FREE**.

THE COLLEGE OF SWEDISH MASSAGE
Dept. 070H, 41 E. Pearson, Chicago 11



LABORATORY TECHNICIAN

BE A LABORATORY SPECIALIST; complete course. Big demand from hospitals, doctors, clinics. We teach all branches of medical laboratory work, including Medical and Dental X-Ray.

Approved by American College of Medical Technologists
Co-educational Free Placement Bureau
Free Catalog—Accredited for "veteran" training

CHICAGO COLLEGE OF LABORATORY TECHNIQUE
Dept. P.S. 431 S. Wabash Ave. Chicago 5, Illinois

NEW—Money Making Sign Painting Book

for

Students, Apprentices,
Sign Painters, Retail
Stores and Others



Learn Sign Painting for profit or as a hobby. This is the book you have waited for. By Duvall, famous "Signs of Times" contributor. Covers sign painting and sign fabrication as it is being done today in the leading shops across the nation. A complete guide for the beginner and hobbyist, from simple letter construction through development of advanced skills and ability. A time-saving, money-making reference book for sign painters, merchants and others who want to learn new techniques and methods. Fully illustrated. Bound in durable cloth. Price only \$3.00. Sent C.O.D. if you prefer. Order on 5-day money back guarantee.

FREDERICK J. DRAKE & CO., Dept. 5B, 117 Green Bay Road, Wilmette, Ill.



**A NEW
D. T. I.
TRAINING
FEATURE**

NOW! Build and Keep
Big Screen Top Quality
Television Receiver at Home
as You Prepare for a
Profitable job in
**TELEVISION
RADIO-ELECTRONICS**

Choice of 10, 12½ or 16 inch picture tube

Now you can get this amazingly practical aid for learning Television at home, to help you get started toward **FASCINATING WORK . . . GOOD MONEY . . . a THRILLING FUTURE**—in a real job, or your own sales and service business. * When you complete our regular home training—described below—you can build and keep a top quality commercial-type Television Re-

ceiver. Standardized chassis is adaptable for a 10, 12½ or 16 inch direct view tube that gives big, bright, sharp, steady pictures. This is an optional training advantage—designed to provide the utmost in practical "learn-by-doing" home training in Television. Mail coupon for complete details. See why you owe it to your "Television Future" to enroll for DeForest's Training, Inc.

Mail Coupon NOW for FREE Information!

See how D. T. I.'s amazingly effective methods help start you toward a **GOOD JOB** or your **OWN BUSINESS** in one of America's most promising fields—including Television, F.M. Radio, Aviation, Train, and Taxi Radio, Broadcast Radio, Industrial Electronics. Get modern lessons . . . plus 16 shipments of Radio-Electronic parts. Work over 300 experiments and projects—including building of (1) commercial-type **OSCILLOSCOPE** for practical

T-V circuit training, (2) double-range R-F **SIGNAL GENERATOR**, (3) jewel-bearing **MULTIMETER**, (4) quality 6-tube **SUPERHET RADIO**. Then build and keep that big new Television Receiver. Here's **EVERYTHING YOU NEED** for real laboratory type training . . . **AT HOME!**

*You also build
and keep this
Professional
Type Equipment*



Modern Chicago Laboratories

* If you prefer, you can get **ALL** your preparation in our new, Chicago training laboratories . . . one of the finest of its kind. Ample instructors . . . modern equipment. Write for details!

Employment Service

* When you complete your training, our effective Employment Service helps you get started toward a real future in Television—Radio—Electronics.

You also use HOME MOVIES!
a D. T. I. Exclusive!



D. T. I. alone includes the modern, visual training aid . . . **MOVIES** . . . to help you learn faster, easier at home. See electrons on the march and other fascinating "hidden action"—a remarkable home training advantage that speeds your progress.

DeFOREST'S TRAINING, INC.
CHICAGO 14, ILLINOIS
A DE VRY Institution

MAIL THIS COUPON NOW!

DeFOREST'S TRAINING, INC.
2533 North Ashland Avenue, Dept. PS-G-7
Chicago 14, Illinois

Without obligation, give me complete facts showing how I may make my start in Television-Radio-Electronics.

Name..... Age.....
Street..... Apt.....
City..... Zone..... State.....

INVENTORS

If you consider your invention to be something of importance — if you have invented any new and useful art, machine, manufacture or composition of matter or improvement thereof — you are advised to protect your invention by applying for a U. S. patent.

This firm is registered to practice before the U. S. Patent Office and is available to assist in the preparation and prosecution of your patent application.

The "Evidence of Invention" form mentioned below is offered as a convenience to you in making your disclosure to us for search purposes.

You should date and sign your disclosure and have it witnessed by two or more persons who are capable of understanding your invention.

Your disclosure should be mailed to us together with a letter authorizing us to conduct a preliminary search among previously granted U. S. patents for similar types of invention.

We then make this search and prepare a report of the probable patentability of your invention. If such report is favorable, we recommend the further course for you to take.

The "Evidence of Invention" form and booklet are suggested as conveniences to you and us in starting action on your invention.

VICTOR J. EVANS & Co. *Merlin M. Evans*
REGISTERED PATENT ATTORNEY
540-H MERLIN BUILDING, WASHINGTON 6, D. C.
PATENTS COPYRIGHTS

We shall be glad to send you promptly and without obligation, an instructive booklet, "Patent Protection for Inventors", which was prepared to give inventors detailed information and steps to take toward patent protection—also our convenient "Evidence of Invention" form. Use address Victor J. Evans & Co., 540-H Merlin Building, Washington 6, D. C.



FULLY GUARANTEED TIRES COST LESS!

Nationally famous FIRESTONE, GOODRICH, U.S. ROYAL, GOODYEAR, and other makes. Every tire selected and inspected for your safety.

S A L E	Military New Tread		New Tread Tires Guaranteed 24 Months	
	Guaranteed 24 mos.			
	600x16	7.48	600x16	6.55
	600x16(6)	8.98	600x16(6)	7.95
	600x16	19.98	600x16(6)	9.45
			650x15	7.55
			650x15(6)	8.55
			700x15	9.55

MILITARY ALL PURPOSE TREADS

900x20	13.98	1000x20	14.98	1100x20	16.98	1000x22	14.98
GOOD TIRES. TUBE FREE WITH THESE TIRES							
600x16	3.58	700x16	4.98	32x6(8)	8.98	825x20	11.48
650x16	3.78	750x16	6.88	32x6(10)	10.88	900x20	11.78
650x15	3.68	650x20	7.58	750x20(8)	8.18	1000x20	12.78
700x15	3.88	700x20(8)	8.98	750x20(10)	9.98	1100x20	13.78

AAA PREMIUM GRADE TUBE FREE WITH THESE TIRES							
600x16	5.18	750x16	7.58	650x20	9.88	825x20	15.68
650x16	5.38	600x16(6)	6.48	700x20	10.88	900x20	14.98
650x15	5.28	700x15(6)	6.98	32x6(8)	10.48	1000x20	16.48
700x15	5.48	700x17(6)	8.88	32x6(10)	12.48	1100x20	17.58
700x16	6.18	750x17	10.88	750x20(8)	10.68	1100x22	18.78
820x15	6.98	600x20	9.18	750x20(10)	12.88	1400x20	25.98

MILITARY SPECIAL 900x16 8.98 750x20 8.98
NEW TRACTOR—IMPLEMENT—INDUSTRIAL—SOLID and AIR-PLANE TIRES and TUBES—WRITE FOR LOW PRICES

Largest stock of used tires in the West. Thousands of satisfied customers. Write for sizes not listed.
Money Order or Check with Order.

PYRAMID TIRE CO.
1333-35 North 5th St.
Dept. S. Phila. 22, Pa.

COMMERCIAL TRADES' GRADUATES GET THE BETTER JOBS because they are PROPERLY TRAINED!

Practical Shop Training In
Air Conditioning—Refrigeration
and/or
Electricity Major Appliances
Service, Maintenance & Installation
Write for Catalog PS4

COMMERCIAL TRADES INSTITUTE
200 South 20th St. Birmingham, Ala.
Member: Southern Association of Private Trade Schools
An approved school to TRAIN Veterans & Non-Veterans

WATCH REPAIRING

Learn this profitable, fascinating, dignified trade in our resident school or by home study in your spare time at home. Home study course uses same precise texts and competent instructors, and costs a lot less. Write for catalog and details—sent free by return mail. Address Dept. B-11.

AMERICAN INSTITUTE OF SPECIALIZED WATCH REPAIR
1012 Franklin S.E. Grand Rapids 7, Michigan

ELECTRIC SHEAR SHARPENER

Over 65,000 Sold—It Must Be Good!



Genuine Carborundum Motor driven wheel ideal for shop or home use. Send remittance with order and shipment will be made at once, prepaid to your door, complete with electrical goods catalogue.

\$9.75
complete with vise

WILLIAM MARVY COMPANY, Dept. 8
479 St. Peter Street St. Paul 2, Minn.

Now ... Brighten your sales!



Amazing! New!

LUMA-LEVEL
...the level with the LIGHT

"Tool of a hundred uses,"

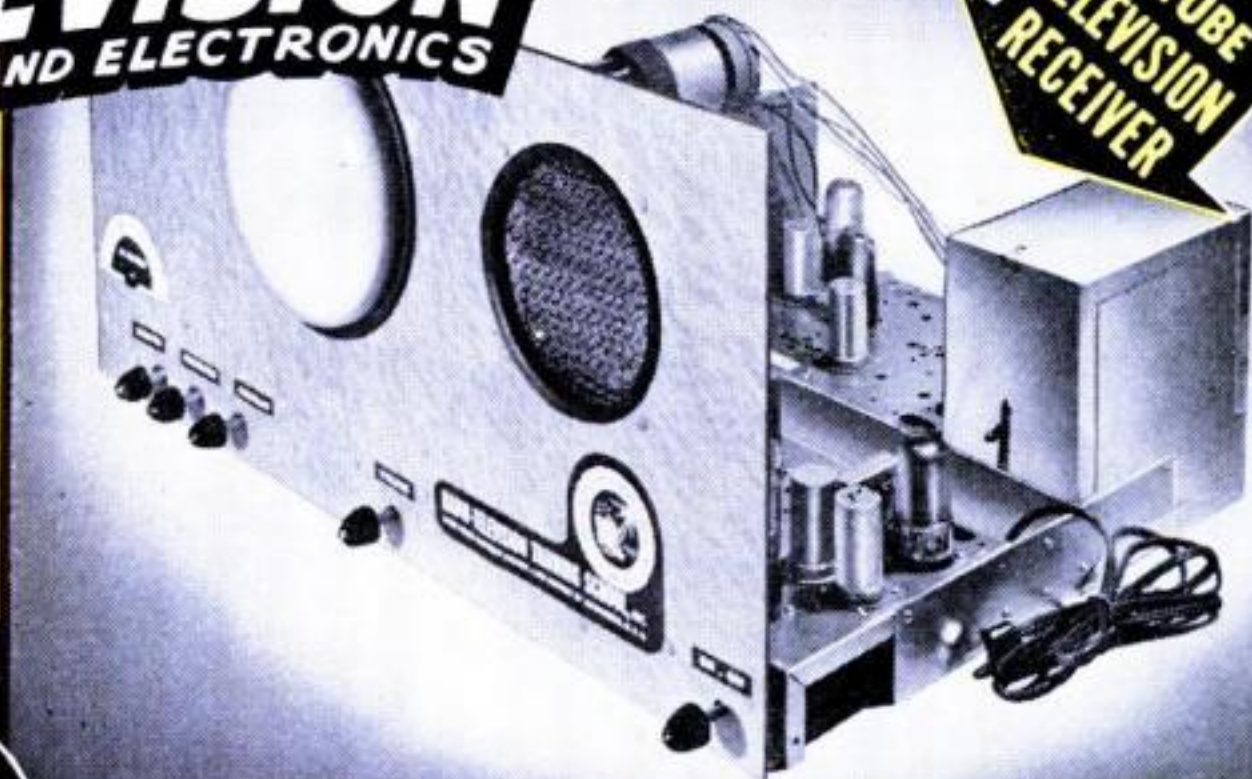
... say carpenters, plumbers, machinists, and tradesmen who have tested this lifetime-guaranteed invention. Designed by a shop foreman who got tired of juggling a light and a level. Luma-level has built-in light source and spare battery compartment. Aluminum casing. A real precision tool at a popular price.

New, unscratched market. Retailers under \$5.00. Big profits. Order sample now! \$2.95. Write for free sales outfit.

INTERNATIONAL MANUFACTURING CO., DEPT. 127
Littleton, Colo.

R.T.S. - ORIGINATORS OF PRACTICAL HOME TRAINING IN **TELEVISION** RADIO AND ELECTRONICS

**YOU BUILD
THIS
23-TUBE
TELEVISION
RECEIVER**



**YOU
KEEP ALL
EQUIPMENT
—it's Yours!**

...GIVES YOU 11 BIG TELEVISION & RADIO KITS AT NO EXTRA COST!

Let RTS show you how to **MAKE GOOD MONEY** in Radio and Television. Learn **NOW** while Television is in its infancy. Be ready for the **BIG BOOM** in America's fastest growing Industry. You will work and learn with **REAL TELEVISION** and **RADIO EQUIPMENT—RIGHT AT HOME!** Study in spare time. You can **EARN EXTRA MONEY** while learning, like many, RTS students.

Located in the heart of the Radio-Television capital of America—RTS has trained thousands during the past 28 years. RTS was **FIRST** to make practical **TELEVISION** training possible at home.

Opportunities are wide open! More than 3 and a half million TV receivers now in use! More than 60 million radios in the country! Daily the demand for **TRAINED MEN INCREASES... EVERYWHERE!**

Prepare **NOW** for these better jobs at **GOOD PAY!** **INVESTIGATE!**

If you want a career in Radio-Television **DON'T ACT WITHOUT GETTING THE FACTS FROM THE LEADER—RTS—ORIGINATORS OF PRACTICAL TELEVISION HOME TRAINING!**

Send coupon for Actual Lesson and **BIG ILLUSTRATED BOOK** — both sent to you **FREE!**

**YOU BUILD
THIS 6-TUBE
SUPER
HETERODYNE
RADIO AND
SHORT WAVE
CONVERTER**



**Both
Free!**
SEND FOR
LESSON
AND BIG
ILLUSTRATED BOOK

FOLLOW THE LEADER • GET THE FACTS

**RADIO-TELEVISION TRAINING SCHOOL, DEPT. PS-7
5100 South Vermont Avenue, Los Angeles 37, Calif., U.S.A.**

Send **FREE** Illustrated Book showing how I can make good in **TELEVISION** and Radio through training under the guidance of expert RTS Technicians. No obligation. (No Salesmen will call)

NAME _____ AGE _____

ST. & NO. _____

CITY _____ ZONE _____ STATE _____

RADIO-TELEVISION TRAINING SCHOOL
5100 S. Vermont Ave., Los Angeles 37, Calif., U.S.A.
ESTABLISHED 1922 — 28 YEARS AGO



**YOU
can
acquire**

LAW NIGHTS AT HOME! L. L. B. DEGREE

LaSalle's famous Law Library—used as reference in many Law libraries and Law offices—has enabled thousands to master Law surprisingly fast, in spare hours at home, for business and professional advancement.

These 14 remarkable volumes, compiled by leading professors and lawyers, cover the whole basic field of Law in condensed, orderly, simplified manner.

You advance rapidly with this great library, plus special lectures furnished. We guide you step-by-step with personalized Problem Method of instruction . . . you *learn by doing*—handling legal problems—not by memorizing rules.

Send for two FREE 48-page booklets, "Law Training for Leadership," and "Evidence," answering questions about Law and its value to you, and telling how LaSalle Law graduates are winning rapid advancement in business and public life. Mail coupon below. No obligation.

LA SALLE EXTENSION UNIVERSITY A Correspondence Institution

417 S. Dearborn St. Dept. 783-L Chicago 5, Ill.

Send me your two FREE booklets described above, without obligation.

Name.....Age.....

Street.....

City, Zone & State.....

INVENTORS

Before you make any effort to market your invention, you should take the first steps toward proceeding for patent protection.

The usual first step is to have a search of the U. S. patent records conducted, so that I can report to you on the question of patentability.

I shall be pleased to furnish you with information relative to patent procedure upon request from you, and this will be without any obligation on your part.

PATRICK D. BEAVERS

(Formerly RANDOLPH & BEAVERS)

Registered Patent Attorney

937 Columbian Building, Washington 1, D. C.

SEND ONLY
10c for

BIG CATALOG of WAR SURPLUS OPTICAL BARGAINS

Build Your Own RIFLESCOPE, BINOCULARS, TELESCOPES, ETC.

We Furnish Optics and Instructions

- LENSES, PRISMS & RETICLES
- EYEPIECES and OBJECTIVES

Send \$1.00 for Stock #2-N
10-Piece Lens Kit and Big
Instruction Booklet.

We Have Numerous Types of Assembled Optical Instruments including BINOCULARS and RIFLESCOPES. CHECK OUR BARGAINS . . . MAIL 10c FOR CATALOG N

EDMUND SALVAGE COMPANY
BARRINGTON, NEW JERSEY

PATENTS PATENT LAWYER

Gustave Miller

REGISTERED PATENT ATTORNEY
70-PS WARNER BLDG.
WASHINGTON 4, D. C.

ASSOCIATE EXAMINER
U. S. PATENT OFFICE 1922-1929
PATENT ATTORNEY & ADVISOR
U. S. NAVY DEPT. 1930-1947

Send for PATENT INFORMATION
Book and "INVENTOR'S RECORD"
without obligation.



PATENTS

C. A. SNOW & CO.

REGISTERED PATENT ATTORNEYS

WRITE FOR INFORMATION TO

426 SNOW BUILDING, WASHINGTON 1, D. C.



INVENTORS

Whether an invention is patentable can be substantially determined by a search of the U. S. Patent records. Without obligation, write for information explaining the steps you should take to secure a patent.

JOHN N. RANDOLPH

Registered Patent Attorney

205 Columbian Building Washington 1, D. C.

HELP FOR INVENTORS

Hundreds of manufacturers have requested our assistance in locating marketable new products.

Complete information, free.

INSTITUTE of AMERICAN INVENTORS

Dept. 3, 631-E St., N.W., Washington 4, D. C.

INVENTORS

IF YOU WISH TO PROTECT YOUR INVENTION, You should take steps to protect it by a U. S. Patent. Write me for "RECORD OF INVENTION" form.

CARL MILLER

REGISTERED PATENT ATTORNEY

WOOLWORTH BLDG., 35th FLOOR, 70C,
NEW YORK CITY

Enter a dynamic profession! **BECOME AN ELECTRICAL ENGINEER**



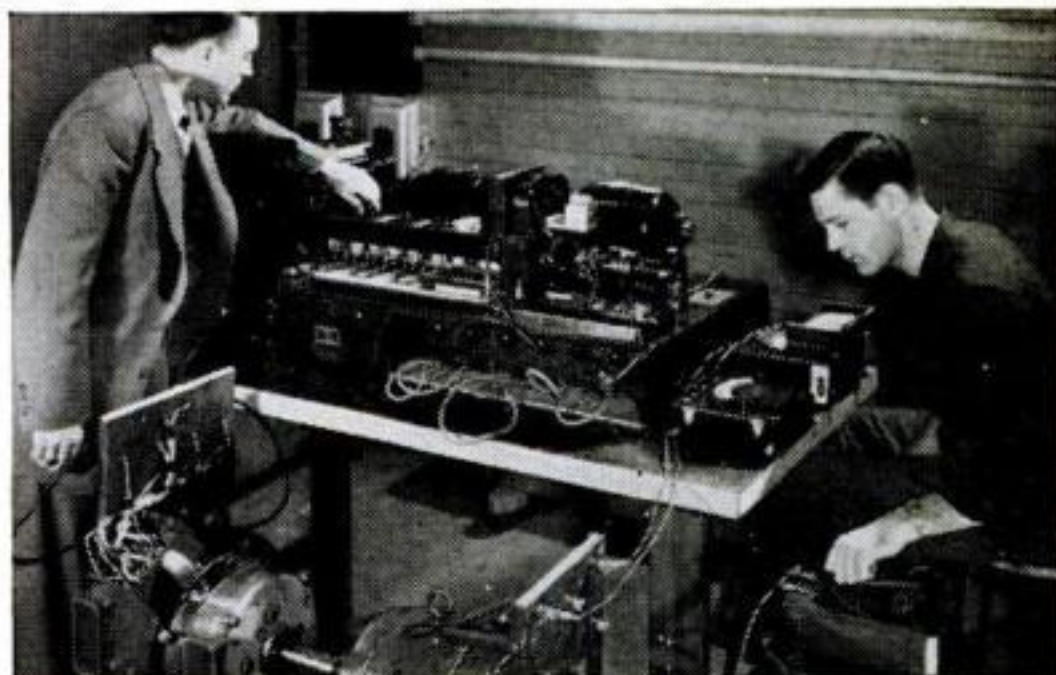
- **MAJOR IN POWER OR ELECTRONICS**
- **B. S. DEGREE IN 36 MONTHS**

LOOK at the powerful trends which influence your future in these fields.

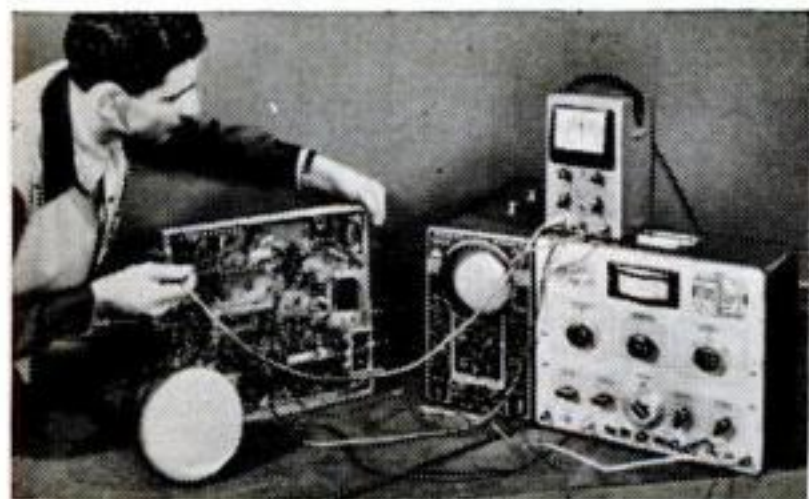
Men specializing in *Power* become equipped to serve the electrical power industry, which must face an 80% expansion of its generating capacity by 1960.

Men specializing in *Electronics* enter a science of tremendous, growing value—in communications, radio, television, broadcasting, high-frequency heating, power system control, printing and other fields.

This 47-year-old Technical Institute and College offers important advantages to the young man preparing for these opportunities. You are invited to get the full facts on what they mean to your career.



The World-famous Course in Power covers 24 technical specialty subjects in Electrical Power, including 8 in Electrical Design. Students in the College of Electrical Engineering receive practical technical laboratory experience on modern equipment. This is integrated, in each successive term, with fundamental education in engineering and the humanities.



The Electronics Course covers 19 technical specialty subjects in Electronics Engineering, including 4 in Electronic Design.

MILWAUKEE SCHOOL of ENGINEERING

Technical Institute • College of Electrical Engineering

Over 35,000 alumni and 1,555 students. Faculty of 85 specialists.

Practical, military or academic training evaluated for advanced credit. Preparatory programs also available.

TERMS OPEN OCTOBER, JANUARY, APRIL, JULY



WRITE TODAY for this free, helpful guidance literature. See how these 6 to 36-month courses can lead to a worthwhile career.



MILWAUKEE SCHOOL OF ENGINEERING

Dept. PS-750—N. Broadway, Milwaukee, Wis.

Without obligation, send:

- ☐ 110-page Catalog
☐ 48-page Pictorial bulletin "Your Career"

I am interested in: **ELECTRICAL ENGINEERING** —

☐ Power ☐ Electronics

☐ Radio-Television ☐ Electricity ☐ Welding

☐ Air Conditioning ☐ Heating ☐ Refrigeration

Name..... Age.....

Address.....

City.....Zone.....State.....

☐ Check if World War II Veteran



START AS HIGH AS \$3,450.00 YEAR

Many early Examinations Expected. Prepare NOW! Veterans Get Special Preference! 40-Page Civil Service Book FREE

Mail Coupon Today SURE



Franklin Institute
Dept. F-80
Rochester 4, N. Y.
(Not Gov't Controlled)

Gentlemen: Rush to me FREE of charge, list of U. S. government big pay jobs. Send FREE 40-page book describing salaries, vacations, hours, work, etc. Tell me how to qualify for one of these jobs.

Name

Street

City..... Vet?.....



DRAW For Money!

BE AN ARTIST

Here's the amazing way we prepare you—step by step—at home in your spare time for a fascinating Art career.

It is pleasant and profitable to study Art the W.S.A. way. Trained Artists are capable of earning \$65, \$80 and more a week. COMMERCIAL ART, DESIGNING, CARTOONING—all in one complete home study course. Good art positions available in this great field. Become your own boss. Many earn extra money while learning. No previous art experience necessary. TWO ART OUTFITS included with training. Low tuition—only \$5 monthly. See how quickly, easily you can get started. FREE BOOK—tells about our modern course, what our graduates say, and commercial opportunities for you.

VETERANS: COURSE G.I. APPROVED

FREE BOOK gives details

WASHINGTON SCHOOL OF ART
Studio 137W, 1115 15 St., N.W.
Washington 5, D. C.

Send full information and Free 32-Page Book, "Art for Pleasure and Profit." (Please print)

Name

Street..... Age.....

City..... Zone..... State.....



GRAVELY 5-HP TRACTOR



DOES 19 LAWN, GARDEN

and FIELD JOBS—

QUICK and EASY!

Sickle Mower attachment cuts tall grass, weeds, head-high, thumb-thick brush! . . . Ideal for jobs around small farms, suburban homes.

* ALL GEAR DRIVE

* POWER REVERSE

* A QUALITY TRACTOR

FREE



"Power vs. Drudgery" tells how to put POWER to work! Write today!

GRAVELY MOTOR PLOW & CULTIVATOR CO.
BOX 784 DUNBAR, W. VA.

FIELD-TESTED FOR 28 YEARS

Learn PHOTOGRAPHY

There's big money in PHOTOGRAPHY—and an action-packed career for you. Our HOME STUDY COURSE is your spare-time SHORT CUT TO SUCCESS! Or, if you wish—PERSONAL ATTENDANCE TRAINING at our famous New York School is available with subsistence under the G. I. Bill. Our 40th year. Write immediately!

NEW YORK INSTITUTE OF PHOTOGRAPHY

Dept. "5," 10 West 33 Street, New York 1, N. Y.



MECHANICAL DENTISTRY

A profession offering unlimited opportunities. Most modern and complete course embracing every branch from Plate to Porcelain Work, which prepares you to work for Dentists or start your own business. Individual instruction—practical training in day or night school. No books—no classes. Catalog upon request.

McCARRIE SCHOOL of Mechanical Dentistry
207 N. Broad Street Dept. 899 Philadelphia, Pa.



OWN a Business

Clean and Mothproof rugs and upholstery "in the home." Patented equipment. No shop needed. Duraclean dealer's gross profits up to \$20 a day on EACH serviceman. These Nationally Advertised services create repeat customers. Easy to learn. Quickly established. Easy terms. Send today for Free Booklet—Full details.

Duraclean Co., 0-187 Duraclean Bldg., Deerfield, Ill.

THE ROSE CO. TV SCOOP!

FACTORY
WIRED!

30 TUBE 630 Type TV
16" or 19" Chassis with
Keyed Automatic Gain
Control

Complete
(less CR
Tube) . . . \$149.50

16" Black Face Tube
1 Yr. Guarantee \$38.50

19" Black Face Tube
1 Yr. Guarantee \$67.50

NOTE: This is not a Kit, but a factory wired, tested and aligned TV Chassis—just plug in and it works. Full TV Channel Coverage—Manufactured under RCA License.

THE ROSE COMPANY 98 Park Place, Dept. P, New York 7, N.Y.



GET
INTO

DIESEL-AUTO

MECHANICS *Master All Phases*

JOBS LIKE THESE ARE AVAILABLE TO TRAINED MECHANICS. CHOOSE THE FIELD YOU LIKE BEST

Get Complete Training

Diesel Fuel Injection
Automotive Motor Tune-up
Diesel Engine Rebuilding
General Garage Mechanic
Agricultural Implements
Auto Engine Rebuilding
Auto Elec. Service
Public Utilities
Parts Dealers
Bus & Truck Lines
Industrial Maintenance
Contracting & Excavating
Business of Your Own
AND MANY other
similar openings.

As a National Schools graduate, you are trained for ALL opportunities in the Diesel & Auto Industries.

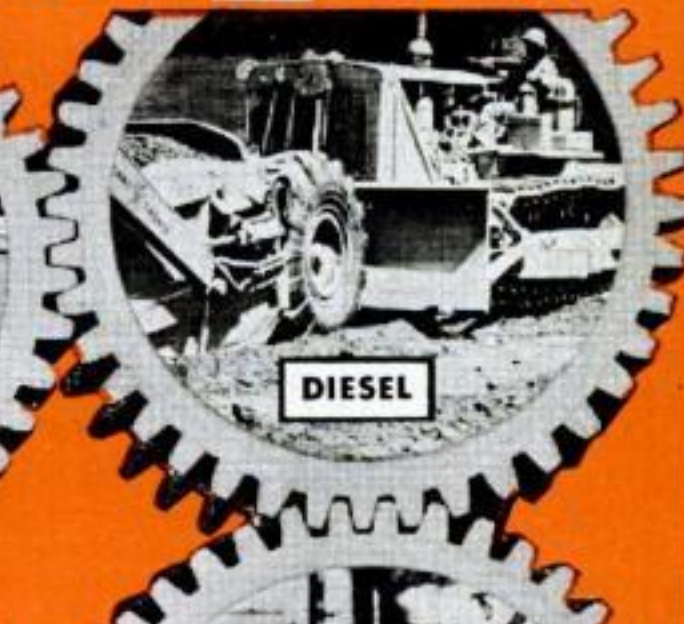
EARN WHILE YOU LEARN

With our practical Master Shop-Method Home Training, you study at home in your spare time. You receive Spare Time Work Lessons, which show you how to earn while you Learn... for extra money and experience. You Learn by DOING.

TOOLS AND EQUIPMENT

To make your training complete, we give you selected mechanic's tools and equipment, illustrated below, including all-metal tool-box—as a regular part of your instruction.

WE GIVE YOU TOOLS OF YOUR TRADE



Shop-Method Home Training by an Established Resident School Prepares you for Many Good Jobs

Opportunity is everywhere for the trained Diesel - Auto Mechanic. Highways throng with cars, busses, trucks tractors. Garages and Service Stations are kept busy. Factories, ships, farms, railroads, general industry, are dependent upon engine power. Here's a dynamic, fast - growing field that needs trained men who know ALL phases: installation, operation, maintenance and repair. Now—National Schools offers you a practical, all-embracing Diesel-Auto Mechanic's Course, including all of these advantages:

Complete training, covering—Diesels, High Speed and Heavy Duty; Semi-Diesels, Gasoline and Special Fuel Engines AND Allied Mechanics.

Basic Lesson Texts
Diesel Installation
Operation—Maintenance
Diesel Chart Manual
Spare Time Lessons
Engine Service Manuals
Engine Repair
Drive Systems
Diesel Electric Power
Thermodynamics

TOOLS AND EQUIPMENT INVESTIGATE

Secure Full Information

NEW, ILLUSTRATED BOOK & SAMPLE LESSON SHOW HOW WE TRAIN YOU...SEND FOR THEM TODAY!

NO COST

NO OBLIGATION

APPROVED FOR VETERANS

Check coupon below

NATIONAL SCHOOLS

LOS ANGELES 37, CALIF. • EST. 1905

FIND OUT NOW...MAIL COUPON TODAY

NATIONAL SCHOOLS, Dept. PSD-7
4000 South Figueroa Street
Los Angeles 37, California

(Mail in envelope or paste on penny postcard)

Mail me FREE the book, YOUR FUTURE IN DIESEL-AUTO MECHANICS, together with the Sample Lesson. I understand I may keep and use the information with no obligation.

Name.....Age.....

Address.....

City.....Zone.....State.....

☐ Check here if Veteran of World War II

JULY 1950 27

SQUARE AWAY FOR TOP PAY!

Learn a Trade Thru C.T.I.!

Start learning your trade now—be ready for big pay, security, independence by 1951! Splendid jobs are waiting in America's top industries. C.T.I. trains you either at home in spare time, or in our residential school. Over 12,000 graduates. One of every 6 starts his own business.

Mail coupon below for valuable FREE booklet. Act!

COMMERCIAL TRADES INSTITUTE

1400 Greenleaf Ave., Dept. E1-7
Chicago 26, Ill.

☐ Veteran
☐ Non-Vet

Send valuable FREE information on opportunities in industry, and how I can train for them.

Name..... Age.....

Address.....

City..... State.....

Course interested in.....

AUTO
MECHANICS

BODY-
FENDER
REPAIR

DIESEL
MECHANICS

ELECTRIC-
ITY

REFRIGER-
ATION

RADIO-
TELEVISION

DRAFTING

BUILDING
CONSTRUC-
TION

FACTORY
MANAGE-
MENT

PAINT COMES OFF

... QUICKLY-EASILY!

Don't waste time and effort with old-fashioned methods of removing paint. Do it the fast, modern WONDER-PASTE way.

Wonder-Paste is a deep-cutting solvent applied with a paint brush. It softens up tough, thickly coated paint, varnish, enamel, lacquer, shellac, etc. and forms a soft sludge that comes off clean. Does not run on upright surfaces. Use it indoors or outdoors. Harmless to hands or fabrics.

Get Wonder-Paste — at paint and hardware stores.

Wilson-Imperial Company, 121 Chestnut Street, Newark 5, N. J.

Write for WONDER-PASTE leaflet

NU-WAY LAWN MOWER

Write for
FREE Circular

Price **\$12.50**
Why Pay More

Build Your Own
Rotary Type Lawn
Mower

We Supply Cutting Unit
Complete.

NO INCREASE
IN PRICE

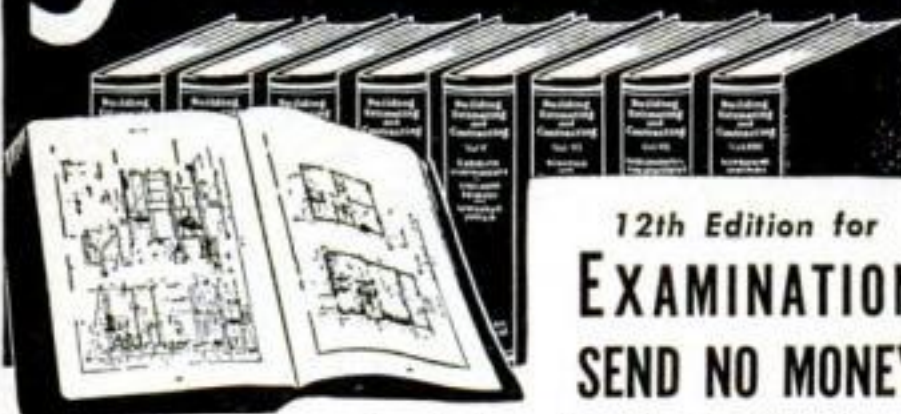
TRACTOR-LITE MFG. CO., SPIRIT LAKE, IOWA

DEPENDABLE CRAFT SUPPLIES

LEATHER CRAFT • PLASTICS • POTTERY
CRAFT • BLOCK PRINTING • BELT CRAFT •
TEXTILE COLORS • POWER TOOLS • WOOD
BURNING • INSTRUCTION BOOKS • ETC.

WRITE FOR CATALOG
SINCE 1928
DWINNELL CRAFT SHOP
Dept. PS 507—Wheeling, W. Va.

9 BIG BUILDING BOOKS



12th Edition for
EXAMINATION
SEND NO MONEY

Learn to draw plans, estimate, be a live-wire builder, do re-modeling, contracting. These 9 practical, profusely illustrated books cover subjects that will help you to get more work and make more money. Masonry, concrete forms, carpentry, steel square, roof framing, construction, plumbing, heating, painting, decorating and many other subjects. More than 4000 pages—2750 illustrations.

BETTER JOBS—BETTER PAY UP-TO-DATE EDITION

A nationwide building boom is in full swing and trained men are needed. Big opportunities are always open for MEN WHO KNOW HOW. These books supply quick, easily understood training and handy, permanent reference information that helps solve building problems.

These books are the most up-to-date and complete we have ever published on these many subjects.

Coupon Brings Nine Big Books For Examination

AMERICAN TECHNICAL SOCIETY — Publishers since 1899
Dept. GB-20 Drexel at 58th Street Chicago 37, Ill.

You may ship me the Up-to-Date edition of your nine big books, "Building, Estimating and Contracting," without any obligation to buy. I will pay the delivery charges only, and if fully satisfied in ten days, I will send you \$3.00, and after that only \$4.00 a month, until the total price of only \$34.80 is paid. I am not obligated in any way unless I keep the books.

Name.....

Address.....

City..... State.....

Please attach a letter stating your age, occupation, employer's name and address, and name and address of at least one business man as a reference. Men in service, also please give home address.

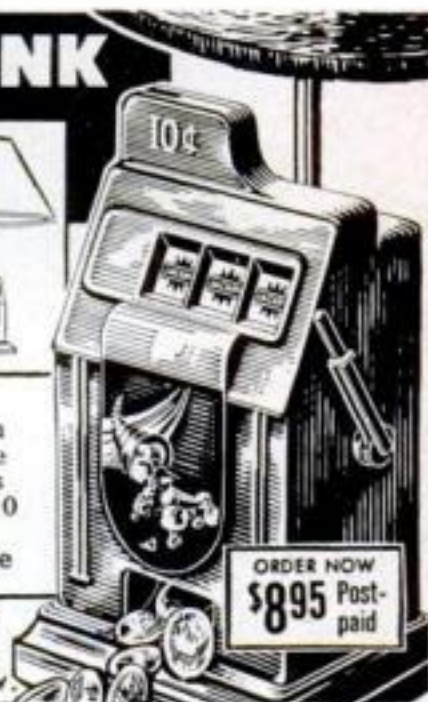
JACKPOT BANK LAMP

(DIRECT FROM LAS VEGAS)

Base is most entertaining, practical home savings bank! Endless fun for all. Smart idea for your rumpus room, bar, den. Grand gift!

- Wonderful for parties
- Not a gambling device but you enjoy the fun of a slot machine
- Teaches children thrift habits
- Special compartment holds \$20
- Nickel plated, 16" high
- 10 day money back guarantee

BARRETT SALES CORP. Dept. 51
NATIONAL DISTRIBUTORS
711 Fremont Street, Las Vegas, Nev.



ORDER NOW
\$895 Post-
paid

How to pass a genius



All of us can't be geniuses. But any ordinarily talented mortal can be a success—and that's more than some geniuses are.

Now, as in Æsop's time, the race doesn't always go to the one who potentially is the swiftest. The *trained* man has no trouble in passing the genius who hasn't improved his talents.

In good times and bad times, in every technical and business field, the *trained* man is worth a dozen untrained ones, no matter how gifted.

The International Correspondence Schools can't make you into a genius. For more than 58 years, however, I. C. S. has been helping its students to become *trained, successful leaders*—and it can do the same for you.

Mark your special interest on the coupon. Don't be like the unsuccessful genius who wastes his life in dreaming of what he intends to do. **Act now!**

INTERNATIONAL CORRESPONDENCE SCHOOLS

APPROVED
under the
G.I. BILL

BOX 5658-M, SCRANTON 9, PENNA.

Without cost or obligation, please send me full particulars about the course BEFORE which I have marked X:

- | | | | | |
|--|--|--|---|---|
| Air Conditioning and Plumbing Courses
<input type="checkbox"/> Air Conditioning
<input type="checkbox"/> Heating
<input type="checkbox"/> Refrigeration
<input type="checkbox"/> Chemical Engineering
<input type="checkbox"/> Chemistry, Analytical
<input type="checkbox"/> Chemistry, Industrial
<input type="checkbox"/> Chemistry, Mfg. Iron & Steel
<input type="checkbox"/> Petroleum Refining
<input type="checkbox"/> Pulp and Paper Making
Civil Engineering, Architectural and Mining Courses
<input type="checkbox"/> Architecture
<input type="checkbox"/> Architectural Drafting
<input type="checkbox"/> Bridge and Building Foreman
<input type="checkbox"/> Building Estimating
<input type="checkbox"/> Civil Engineering
<input type="checkbox"/> Coal Mining
<input type="checkbox"/> Contracting and Building
<input type="checkbox"/> Highway Engineering
<input type="checkbox"/> Lumber Dealer
<input type="checkbox"/> Reading Structural Blueprints
<input type="checkbox"/> Sanitary Engineering
<input type="checkbox"/> Structural Drafting | <input type="checkbox"/> Structural Engineering
<input type="checkbox"/> Surveying and Mapping
Communications Courses
<input type="checkbox"/> Electronics
<input type="checkbox"/> Practical Telephony
<input type="checkbox"/> Radio, General
<input type="checkbox"/> Radio Servicing
<input type="checkbox"/> Telegraph Engineering
Electrical Courses
<input type="checkbox"/> Electrical Drafting
<input type="checkbox"/> Electrical Engineering
<input type="checkbox"/> Electric Light and Power
<input type="checkbox"/> Lighting Technician
<input type="checkbox"/> Practical Electrician
Internal Combustion Engines Courses
<input type="checkbox"/> Auto Technician
<input type="checkbox"/> Diesel-Electric
<input type="checkbox"/> Diesel Engines
Mechanical Courses
<input type="checkbox"/> Aeronautical Engineer's, Jr.
<input type="checkbox"/> Aircraft Drafting
<input type="checkbox"/> Forging
<input type="checkbox"/> Heat Treatment of Metals
<input type="checkbox"/> Industrial Engineering
<input type="checkbox"/> Industrial Instrumentation | <input type="checkbox"/> Industrial Metallurgy
<input type="checkbox"/> Machine Shop
<input type="checkbox"/> Mechanical Engineering
<input type="checkbox"/> Mold-Loft Work
<input type="checkbox"/> Patternmaking—Wood, Metal
<input type="checkbox"/> Reading Shop Blueprints
<input type="checkbox"/> Sheet-Metal Drafting
<input type="checkbox"/> Sheet-Metal Worker
<input type="checkbox"/> Ship Drafting
<input type="checkbox"/> Tool Designing
<input type="checkbox"/> Welding Engineering
<input type="checkbox"/> Welding—Gas and Electric
Railroad Courses
<input type="checkbox"/> Air Brake
<input type="checkbox"/> Diesel Locomotive
<input type="checkbox"/> Locomotive Engineer
<input type="checkbox"/> Locomotive Fireman
<input type="checkbox"/> Locomotive Machinist
<input type="checkbox"/> Railroad Section Foreman
<input type="checkbox"/> Steam-Diesel Loco. Eng.
Stationary Eng'r's Courses
<input type="checkbox"/> Boilermaking
<input type="checkbox"/> Combustion Engineering
<input type="checkbox"/> Engine Running
<input type="checkbox"/> Marine Engineering
<input type="checkbox"/> Power Plant Eng'r's | <input type="checkbox"/> Mech. Drafting
<input type="checkbox"/> Ship Fitting
<input type="checkbox"/> Toolmaking
Textile Courses
<input type="checkbox"/> Cotton Manufacturing
<input type="checkbox"/> Loom Fixing
<input type="checkbox"/> Textile Designing
<input type="checkbox"/> Woolen Manufacturing
Business and Academic Courses
<input type="checkbox"/> Accounting
<input type="checkbox"/> App. Psychology
<input type="checkbox"/> Business Administration
<input type="checkbox"/> Bus. Correspondence
<input type="checkbox"/> Certified Public Accounting
<input type="checkbox"/> Commercial
<input type="checkbox"/> Cost Accounting
<input type="checkbox"/> Federal Tax
<input type="checkbox"/> Foremanship
<input type="checkbox"/> Good English
<input type="checkbox"/> Higher Mathematics
<input type="checkbox"/> Industrial Supervision
<input type="checkbox"/> Motor Traffic
<input type="checkbox"/> Retailing
<input type="checkbox"/> Salesmanship
<input type="checkbox"/> Sign Lettering
<input type="checkbox"/> Spanish
<input type="checkbox"/> Traffic Management | <input type="checkbox"/> Rayon Weaving
<input type="checkbox"/> Bookkeeping
<input type="checkbox"/> Bus. Law
<input type="checkbox"/> Commercial Art
<input type="checkbox"/> First Year College
<input type="checkbox"/> French
<input type="checkbox"/> High School
<input type="checkbox"/> Illustration
<input type="checkbox"/> Postal Civil Service
<input type="checkbox"/> Retail Bus. Management
<input type="checkbox"/> Secretarial
<input type="checkbox"/> Stenography |
|--|--|--|---|---|

Name _____ Age _____ Home Address _____

City _____ State _____ Working Hours _____ A.M. to _____ P.M.

Present Position _____ Employed by _____

Length of Service in World War II _____ Enrollment under G.I. Bill approved for World War II Veterans. Special tuition rates to members of the Armed Forces.
Canadian residents send coupon to International Correspondence Schools Canadian, Ltd., Montreal, Canada.

Learn A Trade NOW! PRACTICAL SHOP TRAINING!

In Our Chicago Shops

- | | |
|---|--|
| <input type="checkbox"/> AUTO MECHANICS | <input type="checkbox"/> WELDING—ARC and GAS |
| <input type="checkbox"/> DIESEL MECHANICS | <input type="checkbox"/> MACHINIST |
| <input type="checkbox"/> REFRIGERATION | <input type="checkbox"/> PIANO TUNING |
| <input type="checkbox"/> BODY-FENDER | |

Above Approved For G. I.'s and Civilians
One of America's Leading Practical Schools
7 Floors of Fully Equipped Shops
Over 50,000 Successful Graduates
Expert Individual Instruction
Learn by Doing—Low Living Expense
Established 1902—Day and Evening Classes

Also the following Home Study Courses

- | | | |
|----------------------------------|--|---------------------------------|
| <input type="checkbox"/> PLASTIC | <input type="checkbox"/> REFRIGERATION | <input type="checkbox"/> DIESEL |
|----------------------------------|--|---------------------------------|

—CALL IN PERSON OR MAIL THIS AD TO—

GREER SHOP TRAINING

(Desk 12) 460 South State St., Chicago 5, Ill.

Please send without obligation free information regarding trade checked above. (Specify whether you are a Veteran ☐ or Civilian ☐)

Name.....Age.....

Address.....

City.....State.....

SHORTHAND in 6 Weeks at Home

Famous Speedwriting system. No signs; no symbols; no machines; uses ABC's. Easy to learn; easy to write and transcribe. Low cost. 100,000 taught by mail. For business and Civil Service. Also typing. 27th year. Write for free booklet to:

Speedwriting

Dept. 2607-A, 55 W. 42 St., New York 18

1,000,000 MEN WANTED IN TELEVISION

Over 1,000,000 high-paying jobs in television waiting to be filled RIGHT NOW! Get to the top faster through practical-shop-training methods! You can earn big money at home while learning; start your own business! Television has proved to be the fastest growing industry in the country. Trained men are in demand NOW for high-paying jobs. RTTA also prepares you for your FCC license! Better pay! Don't wait another day. Send for RTTA's free TV Catalog, Sample Lesson, and details on FREE Round-Trip to New York City from anywhere in U.S. or Canada.

FREE TV

RTTA

CATALOG & SAMPLE LESSON

**RADIO
TELEVISION
TRAINING
ASSOCIATION**

Dept. 157
972 BROAD ST.
NEWARK 1, N. J.

Rush me your FREE Catalog "How to Make Money in Television," in spare time, AT HOME, while learning; details FREE round trip to N. Y. C.; together with FREE Sample Lesson. I am under no obligation.

Name.....Age.....

Address.....

MAKE BIG
MONEY

PLASTICS

LEARN
AT HOME

LEARN HOW
TO MAKE
fast selling
PLASTIC
NOVELTIES
FURNITURE
JEWELRY
SIGNS
TOYS
LAMPS



There are RICH OPPORTUNITIES for MEN and WOMEN with "know-how" in Plastics. Interstate's amazing new Plastics course tells and shows how to make hundreds of fast selling items out of Plastics. Gives complete training in fabrication, casting, lamination, molding, etc., in simple, easy, step-by-step language and pictures.

START A PLASTICS BUSINESS OF YOUR OWN. No other industry holds such promise for the future. You can make big money manufacturing novelties, toys, signs, etc., in your own home in spare or full time. Don't wait! Learn NOW how Interstate's Plastics Training qualifies you for success in the plastics field.

Write for FREE Information Today!

INTERSTATE TRAINING SERVICE

School of Plastics
PORTLAND 13, OREGON

Dept. 2-G

STUDY AT HOME

WITH AN EDUCATIONAL INSTITUTION

Courses in **ENGINEERING**: Electrical, Civil, Mechanical, Drafting, Architectural, Automotive, Steam, Diesel, Aeronautical, Radio, Structural, Mining, Industrial, Petroleum, Marine, Refrigeration, Air Conditioning, Chemical.

Courses in **ARTS AND SCIENCES**: Philosophy; Education; Letters; Public Health; Medical Jurisprudence; Psychology; Sociology; Physics; Chemistry; Geology; Pol. Science; Theology; Law; Business and Commerce; Accounting; Mathematics; Statistics; Agriculture. Send for free catalog.

McKinley-Roosevelt Incorporated, 4610-A3, Sheridan Rd., Chicago 40, Illinois

LEARN TO WRITE a Good Hand!

FOR BUSINESS AND SOCIAL SUCCESS!

Improve your handwriting at home quickly with my new instruction books just off the press. Master all the secrets of better penmanship. Simple and easy, fully illustrated, highly endorsed. Begin today. Write for: ☐ New Free Book, "How to Become a Good Penman", or check books wanted, \$1.00 each. ☐ Business Writing ☐ Artistic Writing ☐ Card Writing ☐ Engraving Alphabets ☐ Bird and Design Flourishing ☐ Complete Set \$4.50 ☐ Enclose 10c for your name beautifully written and shading penpoint. S. A. Ziller, President, TAMBLYN SCHOOL OF PENMANSHIP 439 Ridge Bldg. In Business Over 52 Years Kansas City, Mo., U.S.A.

ELECTRIC MOTOR BARGAINS!



Immediate Delivery

1 HP 3450 RPM \$34.50

1/2 HP 1750 RPM \$15 3/4 HP 1750 RPM \$26
1/2 HP 3450 RPM \$15 3/4 HP 3450 RPM \$26

Every Motor Fully Guaranteed

Heavy Duty, Repulsion Induction or Capacitor Types, 110-220 Volts, 60-cycle, Single-phase. Standard Makes (G. E., Wagner, Leland, Westinghouse, etc.). Rush your order TODAY—large stock of motors—1 & 3 phase, 32-v. direct current bargains. Prices f.o.b. ROBERTS ELECTRIC CO., 7232 Madison, Forest Park 20, Ill.



Everest & Jennings Folding WHEEL CHAIRS

LIGHT, STRONG,
FULL SIZED CHAIRS
FOLDS TO 10 INCHES

Ideal for travel, work, play. Beautifully designed and chrome plated. Try it and you'll buy it. Manufacturers of WING Folding Crutches See your dealer or write

EVEREST & JENNINGS Dept. 87
761 N. Highland Ave., Los Angeles 38, Cal.



YOU CAN'T LOSE!

HAVE A PROFIT MAKING BUSINESS OF YOUR OWN

NATIONALLY
ADVERTISED
PRODUCTS

NO
EXPERIENCE
NECESSARY

NO
MONEY
TO
INVEST

FREE
SAMPLE
OUTFITS

FULL
OR
PART TIME

A LIFETIME FUTURE

Man or woman—young or old, YOU can earn a steady income in full or spare time as an independent Kendex dealer. Amazing and almost "impossible" earnings can become a reality for you. Herbert Armstrong of Tenn. earned \$202 in 9 days. C. O. Watkins of Oregon sent 92 orders in one day. You have the same opportunity to duplicate these exceptional earnings. Over one million dollars will be earned in 1950 by Kendex dealers—why not let us establish you in your own business and get a share of these wonderful earnings?

KENDEX NYLONS REPLACED FREE...

If they run or snag within guarantee period up to three months! Impossible? It's true! No matter what the cause—hard use or deliberate abuse—whether it is fault of the hose or the wearer—Kendex nylons are replaced FREE if they run, snag or become unfit for wear within the guarantee period. How could any woman resist a positive guarantee of satisfaction when she can obtain it without paying any more than other standard advertised brands? Kendex nylons are NOT sold in stores, so you have no competition. Complete line includes everything from heavy 70 denier service weight to gossamer luxurious ultra sheer 15 denier 60 gauge. Proportioned sizes and lengths. Latest colors plus white.

LINGERIE - ROBES - HOUSECOATS - MEN'S HOSE

In addition to the sensational Kendex nylons, you will have a complete line of glamorous lingerie, beautiful robes and housecoats plus a complete line of Kentcraft mens' hosiery guaranteed for one full year. Any pair or pairs of men's hose that does not give satisfactory wear within one year of purchase will be replaced FREE!

NATIONALLY ADVERTISED

Kendex will spend over \$350,000.00 in 1950 to tell millions of readers of the advantages in buying from you. Almost every issue of Good Housekeeping, Saturday Evening Post, McCall's, Women's Home Companion and Ladies' Home Journal carry our advertising in addition to many others. Kendex has advertised in Life, Look, Collier's, etc. Awarded Good Housekeeping Seal. Thousands of orders are shipped daily from coast to coast.



FOUR MONEY-MAKING LINES

- WOMEN'S NYLON HOSIERY
- GLAMOROUS LINGERIE
- HOUSECOATS — ROBES
- MEN'S HOSIERY

MAIL
TODAY

NOTHING
TO
PAY

NO
OBLIGATION

**FREE
NYLON
STOCKING**

EVERYTHING GIVEN FREE

Risk nothing! Mail coupon and we will send you, free and prepaid, complete money-making outfits including sample nylon stocking, samples of lingerie, robes, housecoats and men's hose fabrics and everything you need to immediately start making money. Complete outfits become your property even if you don't send any business. Simply write orders, we deliver and collect. Advance cash plus huge bonus. No money or experience needed. Mailing the coupon is all you need to start on the road to a 52-weeks-of-the-year high paying business of your own. You have everything to gain and nothing to lose.

**KENDEX CORP.
BABYLON 249, N. Y.**

Date _____ 1950

Send me, free and prepaid, everything I need to make money as a Kendex dealer, including sample stocking etc. There is nothing for me to pay now or later and I am under no obligation in accepting your money-making outfits.

Name _____

Address _____

City _____ State _____

KENDEX CORP., BABYLON 249, N. Y.

You'll Find Nearly 1,000 Things To Make and Do in This Great New Home Workshop Book!

EVERYBODY'S HOME WORKSHOP ENCYCLOPEDIA

576 Big Pages!
1,877 Illustrations!



HAMMER-AND-SAW LAMP



HOME MADE POWER TOOLS



PHOTOGRAPHIC EQUIPMENT

DE LUXE Edition

Bound in beautiful, rich Morocco grained pyroxylin-coated, washable Kivar covers... stamped in gold color... with stained page edges and head and foot bands. Only 50c additional—check DE LUXE box on coupon.

Here's the biggest value we've ever offered in a home workshop book! MORE ideas for keeping your home shipshape! MORE money-saving suggestions! MORE pictures! MORE color! HUNDREDS of practical things to make and do. It's packed with working drawings, diagrams and illustrations that show you how to Build Your Own Furniture... how to Improve and Maintain Your Home... how to Build Models... how to Repair Your Radio and Car... how to Care for Tools.

SAVE Money on Home Repairs!

How to fix everything from cellar to attic is explained and illustrated so SIMPLY you can't go wrong. Every project and idea has been pre-tested for you, to make sure it is fool-proof and easy to follow!

NEW Chart Ends Guess-Work!

This great book includes an exclusive NEW feature that tells exactly what tools and materials you need for EVERY project—how long it should take—and a wealth of other information *not included in any other workshop book regardless of price!*

Full Week's FREE TRIAL

You don't risk a single penny! Just fill out and mail coupon below. When your Encyclopedia comes, pay the postman the low bargain price of only \$2.98, plus a few cents' postage. At the end of 7 days' free trial, if you aren't satisfied—send it back, and we'll refund your money in full. You RISK NOTHING so mail the coupon NOW!

Mail FREE TRIAL COUPON Today!

POPULAR SCIENCE, Dept. 750, 353 Fourth Ave., New York 10, N. Y.
Send EVERYBODY'S HOME WORKSHOP ENCYCLOPEDIA in edition checked. When book arrives, I will pay postman price plus a few cents' postal charges. If not fully satisfied, I may return the book within 7 days for full refund.

☐ De Luxe Edition, \$3.48

☐ Regular Edition, \$2.98

Name.....

Address.....

City.....Zone.....State.....

☐ Check here if you enclose remittance and we will pay postage. Same return and refund privileges.



Start Your OWN ELECTRICAL APPLIANCE REPAIR BUSINESS

Repair electrical appliances of friends and neighbors. Service electrical equipment in factories, stores, etc. Work full or part time! New Shop Method home-training system. Rush name today for **FREE BOOK** and special form for getting Electronic Kit, Valuable Heating Element Kits, Advisory Service and Illustrated Instructions on new easy-payment plan. Pay later from **EARNINGS WHILE LEARNING**. Rush name today.


CHRISTY TRADES SCHOOL
4432 N. Kedzie Dept. D-9201 Chicago 25

Trained Men Get the Better Jobs
PRACTICAL SHOP TRAINING
in AUTOMOTIVE MECHANICS
BODY and FENDER REBUILDING

If interested write or wire

ATLANTA MOTIVE TRADES INSTITUTE
Dept. C 254 IVY St., N.E. Atlanta, Georgia

Member of the Southern Association of Private Trade Schools
Veterans ask about G I Training



'How to Make Money with Simple Cartoons'

A book everyone who likes to draw should have. It is free; no obligation. Simply address **FREE BOOK**

CARTOONISTS' EXCHANGE
Dept. 197D Pleasant Hill, Ohio



BARBELLS
\$7.98 SATISFACTION GUARANTEED
OR YOUR MONEY BACK!

Proven \$15 bodybuilding course FREE with every purchase. YOUR MONEY BACK if not delighted with results after 6 weeks.
Send for FREE CATALOG

DAN LURIE BARBELL CO.
1701 S-7 Pitkin Avenue, Dept. 170-G, Brooklyn 12, N. Y.

There's A Career for YOU in TELEVISION

TV Industry needs trained technicians and engineers. Graduates of CREI Residence School are preferred because of their thorough training. This high level technical course requires the average student 20 months to complete. Write for Free Booklet and Details.

CAPITOL RADIO ENGINEERING INSTITUTE
Dept. 167B, 16th & Park Rd., N.W., Washington 10, D. C.

Be A MASTER PLUMBER
Earn \$15 To \$50 A Day

DON'T ENVY THE PLUMBER—BE ONE

Every skilled workman will tell you that Plumbers have the best of it. WINTER and SUMMER the Plumber is busy at top wages. No skilled Plumber is ever out of a job—compare his opportunities with any trade, plus the opportunities of having your own shop. We teach you Plumbing with **TOOLS** (not books) under Licensed Master PLUMBERS in one of the finest equipped schools in America. We make you a Plumber, every branch is taught thoroughly—Lead Work—Blueprint for plan reading—all other tricks.

LEARN IN 32 WEEKS WITHOUT PREVIOUS EXPERIENCE

If you like to work with tools you owe it to yourself to investigate. No need to ever work as an apprentice. Get free bulletin. Write now! G.I. APPROVED. Our 24th year.

UNIVERSAL PLUMBING SCHOOL
819 HOLMES STREET KANSAS CITY, MO.



What's your problem...

NOT SATISFIED with YOUR PAY CHECK?

Home study training, in spare time, can increase your earnings!

The success of many of today's money-makers started in a coupon similar to the one below, which they checked, signed and mailed to **AMERICAN SCHOOL**. The information they received opened doors of real opportunity to promotions and bigger pay checks.

Who earns these rewards? It's the ambitious man with know-how and self-confidence which come from training. It's the man who looks far beyond the next pay day and sets his goal, and is willing to devote some of his spare time to acquiring the knowledge that will give him the power to climb the success ladder.

IT COSTS SO LITTLE — PROVIDES SO MUCH

At a cost you can afford and in hours you might otherwise waste you can prepare to climb in the field of work you prefer. American School, an educational institution organized *not for profit*, offers you a wide choice of training opportunities. Give serious thought to the list in the coupon, then check one or more subjects, add your name and address and mail it. You will receive full information, without obligation of any kind. Do it now.

AMERICAN SCHOOL
DEPT. GB-46, DREXEL AT 58th, CHICAGO 37

PRACTICAL, EFFECTIVE HOME - STUDY TRAINING SINCE 1897

Take This First Easy Step

CHECK, CLIP AND MAIL COUPON NOW

AMERICAN SCHOOL, Dept. GB-46, Drexel at 58th, Chicago 37, Ill.
Without obligation, please send me FREE information on training course checked below.

<input type="checkbox"/> Accounting	<input type="checkbox"/> Business Mngmt.	<input type="checkbox"/> Plastics Engr.
<input type="checkbox"/> Air Conditioning	<input type="checkbox"/> Contracting	<input type="checkbox"/> Plumbing—Pract.
<input type="checkbox"/> Architecture & Building	<input type="checkbox"/> Diesel Engr.	<input type="checkbox"/> Private Secretary
<input type="checkbox"/> Automotive Engineering	<input type="checkbox"/> Drafting & Design	<input type="checkbox"/> Radio Operating & Servicing
<input type="checkbox"/> Aviation—Practical	<input type="checkbox"/> Electrical Engr.	<input type="checkbox"/> Railway Training
<input type="checkbox"/> Aviation Drafting & Design	<input type="checkbox"/> Electricity—Pract.	<input type="checkbox"/> Refrigeration
<input type="checkbox"/> Better Forem'nship	<input type="checkbox"/> Electronics, Indus.	<input type="checkbox"/> Sheet Metal
<input type="checkbox"/> Bookkeeping	<input type="checkbox"/> High School	<input type="checkbox"/> Pattern Drafting
	<input type="checkbox"/> Machine Shop	<input type="checkbox"/> Shop Management
	<input type="checkbox"/> Operations	<input type="checkbox"/> Tool Making
	<input type="checkbox"/> Mechanical Engr.	

Name _____ Occupation _____

Address _____ Age _____

City & Zone _____ State _____

FREE ALLIED'S RADIO & TV CATALOG SUPPLEMENT

LATEST RADIO & TV RELEASES HUNDREDS OF GREAT VALUES

Send for ALLIED's latest Supplement! Packed with new TV releases, home radios, recorders, High-Fidelity Music and P. A. Systems, test instruments, new electronic developments—plus hundreds of big values. Get the latest—get more for your money—get your FREE ALLIED Supplement now Write for it today!



HELPFUL RADIO BOOKS!

Dictionary of Electronic Terms. All-new reference guide has definitions of over 2500 terms used in television, radio, electronics and nucleonics. Invaluable for engineers, students, experimenters. Has useful data appendix. Published and made available by ALLIED at minimum cost. No. 37-756. Only..... **25c**

Radio Formulas & Data.....No. 37-752...10c All 6 Books
Simplified Radio Servicing.....No. 37-755...10c No. 37-799
Radio Builders' Handbook.....No. 37-750...15c
Radio Circuit Handbook.....No. 37-753...25c
Radio Data Handbook.....No. 37-754...25c Only **\$1.00**

FREE CATALOG

Order from **ALLIED RADIO**
833 W. Jackson Blvd. • Dept. 7-G-0 • Chicago 7

ALLIED RADIO

See your ALLIED Catalog for Everything in Radio & TV

LAW FREE BOOK



Your FREE copy of "The Law-Trained Man" shows how to gain prestige and greater earnings through Blackstone home law study. All instruction material furnished including 18-volume Law Library written by 65 well-known law authorities. Lawyers, judges among our graduates. LL.B. degree. Low cost; easy terms. Write today. **BLACKSTONE COLLEGE OF LAW** Dept. 120B, Chicago 1, ILL. 225 N. Michigan Ave. A Correspondence Institution Founded in 1890

Brand new business offers LARGE PROFITS!



Thousands are now starting their own lawn edging business for spare or full time profits with the amazing new TRIMEDGE lawn edger. Saves up to 90% of lawn edging time and gives every lawn that well-groomed look. Even modest routes yield \$50.00 a weekend. Sturdily constructed, light weight and easy-to-use, TRIMEDGE MIDGET only \$72.50. Write TRIMEDGE COMPANY, 15809 South Atlantic Avenue, Compton, California.

Save UP TO 25% ON QUALITY BALL-BEARING WHEELS



Bilt-Rite wheels roll smoothly and easily, are semi-pneumatic, ball-bearing, painted red; guaranteed top quality—and you save up to 25%! Compare Bilt-Rite's quality and price; then get your order in today! Dealer inquiries invited.

Ball-Bearing Wheels at Bargain Prices

(For 1/2" axles)			
6 x 1.00	\$1.30	10 x 1.25	\$1.95
8 x 1.25	1.65	10 x 1.75	2.15
8 x 1.75	1.80	10 x 2.00	2.45
(For 5/8" axles)			
6 x 2.00	\$3.95	8 x 2.50	\$4.45
10 x 2.75	Only \$4.65!		

Bilt-Rite Guarantee
No better wheels are made regardless of price; 10 day return privilege.

If size you need isn't listed, write for Folio A. Order Today—Send cash, check, or M. O.—Pay postage on arrival.

BILT-RITE WHEEL COMPANY

520 East Missouri Ave. Dept. 77 Kansas City 6, Missouri

CARBURETOR TOO RICH MAKES MOTORIST TOO POOR



Car owners who are wasting money and not getting proper gas mileage due to over-rich mixtures will be pleased to learn how to save gasoline by VACU-MATING over-rich mixtures. VACU-MATIC fits all cars, trucks and tractors. It is automatic and operates on the supercharge principle. Easily installed in a few minutes.

SALESMEN WANTED! Big Profits! Send name, address on penny postcard for free particulars and how to get yours for introducing.

VACU - MATIC CO., 7617 - 1627 W. State St., WAUWATOSA, WIS.

IT'S FUN LEARNING A LANGUAGE BY LINGUAPHONE

AT HOME in leisure time, quickly, easily, correctly master Spanish, French, Italian—any one of 29 languages through proved Linguaphone conversational method. Add to job, school, travel opportunities. Send for fascinating FREE book.

LINGUAPHONE INSTITUTE

95-L Radio City

New York 20, N. Y.

WATCHMAKING

Be a Watchmaker—Be Independent

Get practical training in Chicago's first accredited watchmaking school. Day and Evening Classes—Approved for Veterans.

Write today for free information

CHICAGO INSTITUTE OF WATCHMAKING

6 East Lake Street Dept. PS-7 Chicago, Illinois

ARMY SURPLUS BARGAINS FOR THE HOME — SHOP — HANDYMAN

Send for our FREE catalog of Surplus Bargains. All NEW top-quality merchandise. Buy from Army Surplus Sales of Fresno—and save! Also big stock of brand-new home utility power hand-tools, drills, saws, etc. All products of Black & Decker. Tremendous buying power and low overhead means lowest prices.

ARMY SURPLUS SALES OF FRESNO—Dept. 17
1820 Tulare Street Fresno, California
THE FRESNO HARDWARE COMPANY

**NATION'S
LARGEST
EXCLUSIVE
ELECTRICAL
SCHOOL**

"LEARN-BY-DOING"

ELECTRICITY

PRACTICAL TRAINING
NOT "HOME STUDY"

Get actual experience in great shops of M.T.I. Learn all phases Practical Electricity; Housewiring, Motors, Const., Maintenance, etc. Living arrangements, Part-time jobs, etc. Pay after graduate plan.

A post card brings the story.

MICHIGAN TECHNICAL INSTITUTE, Dept. PS-7
2281 W. Fort St., Detroit 16, Michigan

MODERN LAWN MOWER SHARPENER

**FOR LAWN MOWER SHOPS
FIX-IT SHOPS
GOLF COURSES • PARKS
101 OTHER JOBS**

Sharpens All Reel Type Mowers •
Hand, Power or Gang • 10 to 20
Minutes • No Dismantling • No
Extra Attachments Needed.

All reel type mowers, from 5-inch
edgers to 36-inch power mowers,
are quickly sharpened to extreme
ends of both left and right twist blades.

Handle, wheels, roller and motor
remain in place when sharpen-
ing is in process. Bed knife
is sharpened in same brackets.
Grinding head rides on five ball
bearing races. Easy to operate.

Also sharpens chisels, joiner knives, planer
blades. Big profit maker. Own your own business.
Send Today for **FREE** Illustrated Bulletin No. 11-C1

ORDER NOW
Immediate Delivery

PRICE \$241.50
less motor

\$263.00
with motor

MODERN MFG. CO. 160 N. FAIR OAKS AVE
PASADENA 1, CALIFORNIA

JOBBER'S PLASTIC-SHINE

DISTRIBUTORS:

**LIQUID PLASTIC CAR POLISH IN
GROWING DEMAND EVERYWHERE**

• SALES GALORE
• RE-ORDERS POURING IN
• HUGE PROFITS
• NATIONALLY ADVERTISED
• EXCLUSIVE TERRITORIES OPEN

SEND FOR DETAILS!

PLASTIC-SHINE LABS., INC.
7615 N. W. 7th AVE., MIAMI, FLA.

Free Book

RAISE HAMSTERS

The new wonder animals from Syria. Often called Toy Bears. Delightful pets. Everyone wants them. Laboratories need thousands. Clean, odorless. Raise anywhere. A profitable and interesting hobby or business. We furnish breeders and instructions. Write today for free book.

GULF HAMSTERY, 1540 BASIL ST., MOBILE, ALA.

it's fun to earn RAISING HAMSTERS

Cash in on the growing demand for SYRIAN GOLDEN HAMSTERS recently introduced into the U. S. Ideal pets . . . big laboratory demand. Hardy, clean, odorless. Easily and profitably raised anywhere.

AKOPIAN HAMSTERY
the largest in the West
7358-BC VARNA AVE • NORTH HOLLYWOOD, CALIF.



write for
FREE booklet

CHRONOGRAPH WRIST WATCH

Lifetime Guarantee
(EXCLUSIVE OF PARTS)
3 DIALS—5 HANDS—2 BUTTONS

Multi-purpose watch that measures distance, speed, time, moving objects. Used as Stop Watch or Timepiece. Has Sweep-Second Hand for full 60 Second count. Second Dial records up to 45 minutes. Third Dial then records up to 6 hours. Seconds—Minutes—Hours, all recorded automatically.

INDEPENDENT MOVEMENTS
The movement of this line Swiss Made watch continues to run when sweep hands are stopped. For sportsmen, professional men and women—time-keeper works when other hands and dials are stopped—separate movements permit dual use at same time.

RUGGED CONSTRUCTION
Precision workmanship and shock resistant features are added to enhance the value of this watch. Sold elsewhere for as high as \$17.00. Our low introductory price is only \$7.90 plus 10% tax. (Total \$8.69). Send check or money order and we prepay postage. Or sent C.O.D. plus charges. **LIMITED STOCK!**

MARDO SALES CO., 480 Lexington Ave., Dept. 1814, N. Y. 17, N. Y.

\$7.90
Plus Tax



AUDELS Carpenters and Builders Guides

4 vols. \$6



Inside Trade Information
for Carpenters, Builders, Joiners, Building Mechanics and all Woodworkers. These Guides give you the short-cut instructions that you want—including new methods, ideas, solutions, plans, systems and money saving suggestions. An easy progressive course for the apprentice and student. A practical daily helper and Quick Reference for the master worker. Carpenters everywhere are using these Guides as a Helping Hand to Easier Work, Better Work and Better Pay. To get this assistance for yourself, simply fill in and mail **FREE COUPON** below.

Inside Trade Information On:

How to use the steel square—How to file and set saws—How to build furniture—How to use a mitre box—How to use the chalk line—How to use rules and scales—How to make joints—Carpenters arithmetic—Solving mensuration problems—Estimating strength of timbers—How to set girders and sills—How to frame houses and roofs—How to estimate costs—How to build houses, barns, garages, bungalows, etc.—How to read and draw plans—Drawing up specifications—How to excavate—How to use settings 12, 13 and 17 on the steel square—How to build hoists and scaffolds—skylights—How to build stairs—How to put on interior trim—How to hang doors—How to lath—lay floors—How to paint.



Step up your own skill with the facts and figures of your trade. Audels Mechanics Guides contain Practical Inside Trade Information in a handy form, Fully illustrated and Easy to Understand. Highly Endorsed. Check the book you want for 7 DAYS FREE EXAMINATION. Send No Money, Nothing to pay Postman.

--- CUT HERE --- MAIL ORDER

AUDEL, Publishers, 49 W. 23 St., NEW YORK 10, N. Y.

Please send me postpaid for **FREE EXAMINATION** books marked (X) below. If I decide to keep them I agree to mail \$1 in 7 Days on each book or set ordered and further mail \$1 monthly on each book or set until I have paid price, otherwise I will return them.

- Check NOW!**
- You Can Look Over Any Guide In Your Own Home — Start the Easy Payments If Satisfied**
- MAIL THIS TODAY**
- ☐ CARPENTERS & Builders Guides (4 Book Set) \$6
 - ☐ MASONS & Builders Guides (4 Book Set) 6
 - ☐ PLUMBERS & Steamfitters Guides (4 Book Set) 6
 - ☐ OIL BURNER GUIDE, 384 Pages 1
 - ☐ HOUSE HEATING GUIDE, 1000 Pages 4
 - ☐ PAINTERS & DECORATORS MANUAL, 450 Pgs. 2
 - ☐ BLUE PRINT READING, 416 Pages 2
 - ☐ REFRIGERATION & Air Conditioning, 1280 Pgs. 4
 - ☐ SHEET METAL WORKERS Handy Book, 388 Pgs. 1
 - ☐ SHEET METAL PATTERN LAYOUTS, 1100 Pgs. 4
 - ☐ AIRCRAFT WORKER, 240 Pages 1
 - ☐ GARDENERS & GROWERS Guides (4 Book Set) 6
 - ☐ AUTO MECHANICS GUIDE 4
 - ☐ DIESEL ENGINE MANUAL, 400 Pages 2
 - ☐ WELDERS GUIDE, 400 Pages 1
 - ☐ MACHINISTS Handy Book, 1600 Pages 4
 - ☐ MECHANICAL DRAWING GUIDE, 160 Pages 1
 - ☐ MECHANICAL DRAWING & DESIGN, 480 Pgs. 2
 - ☐ MATHEMATICS & CALCULATIONS, 700 Pgs. 2
 - ☐ MECHANICAL Dictionary, 968 Pages 4
 - ☐ MILLWRIGHTS & Mechanics Guide, 1200 Pgs. 4
 - ☐ POWER PLANT ENGINEERS Guide, 1500 Pages 4
 - ☐ ENGINEERS & FIREMANS EXAMS, 528 Pages 1
 - ☐ PUMPS, Hydraulics & Air Compressors, 1658 Pgs. 4
 - ☐ MARINE ENGINEERS Handy Book, 1280 Pages 4
 - ☐ ENGINEERS & Mechanics Guides (8 Book Set) 12
 - ☐ Answers on Practical ENGINEERING, 254 Pages 1
 - ☐ ELECTRIC WIRING DIAGRAMS, 210 Pages 1
 - ☐ ELECTRICIANS EXAMINATIONS, 250 Pages 1
 - ☐ ELECTRICAL DICTIONARY, 9000 Terms 2
 - ☐ ELECTRIC MOTOR GUIDE, 1000 Pages 4
 - ☐ HANDY BOOK OF ELECTRICITY, 1440 Pages 4
 - ☐ ELECTRICAL POWER CALCULATIONS, 425 Pgs. 2
 - ☐ RADIOMANS GUIDE, 975 Pages 4
 - ☐ ELECTRONIC DEVICES, 216 Pages 2
 - ☐ ELECTRIC LIBRARY, 7000 Pages (12 Book Set) 18
- Vol. I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII \$1.50 Ea.**

Name _____
Address _____
Occupation _____
Employed by _____

AMERICA'S GREATEST WAR SURPLUS BARGAINS!

BUY NOW...AND SAVE 50% TO 85%

BRAND NEW WAR SURPLUS!



GENERATORS 115V-AC

FOR AUXILIARY LIGHT PLANTS

NOW...here's the buy of the year. Brand new Eclipse Generators in the original box.

These generators have an AC output of 115 volts, 10.4 amps, 1200 watts, single phase, 800 cycles at 2400 R.P.M. They also have a DC output of 28.6 volts, 60 amps. The unit has a spline drive shaft and is self excited. It will serve as a dependable 115 V.-AC auxiliary light plant when driven by a gasoline engine for farms, cottages, flood lighting, trailers, boats, or wherever power is not readily accessible. Shipping wt. 55 lbs. Govt. cost more than 10 times selling price. F.O.B. Pasadena

ONLY
\$19.95

BLACK LIGHT KITS

FOR ULTRA-VIOLET FLUORESCENCE

NOW...you can build your own black light equipment at a new low cost with these easy-to-assemble components. Geologists, mineral prospectors and hobbyists can easily make laboratory black lights for mineral identification. Signs, posters, pictures, fabrics, house numbers... anything painted with fluorescent paint glows with eye-appealing fluorescence under black light. Kit contains: Ultra-Violet tube, brackets, ballast, starter, wire, plug and wiring diagram.

Special! 4 Watt Kit—(5 1/4" tube)..... postpaid\$3.00
8 Watt Kit—(12" tube)..... postpaid\$4.00



C & H WAR SURPLUS CATALOG

It's jam-packed with surplus values galore for the radio experimenter, home, workshop, farm, factory and sportsman. New, used and reconditioned items at 50% to 85% savings.

Enclose full amount with order

SEND
10c
TODAY

C & H Sales Company

BOX 356-S EAST PASADENA STATION • PASADENA 8, CALIFORNIA

Learn TELEVISION RADIO— ELECTRONICS

Prepare in spare hours for good pay in Television, Radio and Electronics. Train at home with Frank L. Sprayberry, America's outstanding Radio instructor. Big Kits of equipment furnished. Build testers, sets, etc. VETERANS: Approved for Training under GI Bill. Rush name and address for details and 2 BIG RADIO BOOKS—ALL FREE! No salesman will call. Write today!

Sprayberry Academy of Radio, Dept. 55-L
111 N. Canal Chicago 6, Illinois

SANDEE

Mufflers—All Ford, Chev., Ply....\$4.45

All Buick, Pont., Olds., Chrys.,
Dodge, Hudson, K.F., Pack., etc.....\$5.45

V-8 and Merc. Duals
(32-50 incl.)
\$15.95

DEALERS
WANTED

SPORTONE
(Reg. U. S. Pat. Off.)
MUFFLERS

DURABILITY

Beautiful
SANDEE
Fender Skirts
\$9.95

A SANDEE Sportone will outlast two ordinary mufflers and give More Power! More Speed! More Mileage!—plus a tone quality unsurpassed.

Please ship (item): _____ Price _____
Car and Year _____ Name _____
Address _____

SANDEE MUFFLER CO. 5643 Corryne Pl. Culver City, Calif.

36 POPULAR SCIENCE

NAVY PHONES

VOICE POWERED
—NO BATTERIES



Mfg. by RCA. Simple hook-up. Splice 2 wires & talk over 1/2 mile. Complete—no extras to buy. Each phone has headset, adjustable transmitter, chest plate, switch (on mike) PLUS 24' of rubber-covered cable. Navy cost \$99 pr. **BRAND NEW—NEVER USED.** For home-owners, sportsmen, vacationists, farmers, contractors, mines, mills, television set installers, etc. Money back guarantee. Send check, cash, M.O. C.O.D.'s pay postage.

DEALER INQUIRIES INVITED

\$13.95

pp. for 2
phones complete

GRAND-HAWTHORNE SURPLUS
1439 SE Grand Dept. PS70 Portland 14, Oregon

Learn PHOTOGRAPHY at Home

Splendid Hobby or Vocation

Prepare in spare time. Practical basic training. Long-established school. Send for free booklet, "Opportunities in Modern Photography" and particulars. Sent postage prepaid. No obligation.

AMERICAN SCHOOL OF PHOTOGRAPHY
1315 S. Michigan Avenue, Dept. 136B Chicago 5, Illinois

SHARPEN CIRCULAR SAWS LIKE AN EXPERT



\$6.95

No experience needed. Two simple adjustments. Gets hollow-ground, cross-cut or combination saw blades true and sharp. Fits 6" to 12" blades with 1/2" to 13/16" centers. Includes file and complete instructions. \$6.95 postpaid. (Check or money order) C.O.D.'s postage extra. Guaranteed—Money back if not satisfied after 10 day trial. A money maker for fix-it shops. Soon pays for itself. Order today. Free folder.

SURE SHARP MFG. CO., Dept. M-70
P. O. Box 24 Santa Ana, Calif.

"PLASTICS"

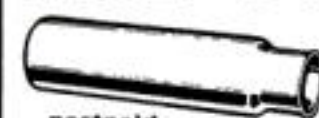
FABRICATING MANUAL AND CATALOGUE

Work in a fascinating and profitable hobby. Just out—our latest fabricating manual. Tells you how to work with Plastics. Our new Catalogue provides all needed materials: Plexiglas—Lucite—Fenite—Catalin—Acetate—all in sheets, rods, and tubes. Complete line of cements, dyes, accessories and supplies. Send 20c today for latest Catalogue and Handbook.

HOUSE OF PLASTICS

8648 Linwood Avenue Dept. MO-7 Detroit 6, Michigan

THE BIG "3" TAIL PIPE EXTENSION



postpaid
\$3.95 \$7.50
each per pair

12" LONG—BIG 3" DIA. MAKES A SMOOTH MOTOR BOAT TONE WITH ANY STANDARD MUFFLER

Beautifully chromed, the Big "3" adds to appearance of car and prevents burned bumper. Fits all cars. Get yours today. Write for Wohlfeil's new folder on special speed and racing equipment. **DEALERS WANTED**

WOHLFEIL DEE ENGINEERING CO., 2274 So. Telegraph Rd., Pontiac, Michigan

BUY U. S. SAVINGS BONDS

WASH YOUR CAR IN 10 MINUTES!

WHILE WEARING BEST CLOTHES. "Wash Faster" fountain brush, \$10 value, turns work into pleasure. Washes and rinses in one operation cars, trucks, boats, windows, screens. **NO COLD, WET, SOILED HANDS** Brass Nut Fits Hose



All rubber covered 4 ft. aluminum tube handle. Rubber head, 6 in. 100 percent horsehair brush. Won't mar car. Cash, Check, M.O., Postpaid. Pays For Itself—Satisfaction Guaranteed

only
\$6.95

WINSLOW MFG. CO., Dept. P 1428 Balfour, Detroit 30, Mich.

TO THOSE WHO THINK LEARNING MUSIC IS HARD

Just strike these notes and you're playing the beginning of the "Merry Widow" Waltz



Look at the diagram. The first note of the music is "D." Following the dotted line to the keyboard you'll find "D" is the white key between the two black keys near the middle of the keyboard. Now read below how you can learn to play any instrument quickly and easily.



EASY AS A-B-C—COSTS JUST A FEW CENTS A DAY!

● Perhaps you think learning music is a tedious grind. It isn't any longer! Long hours of practicing scales and monotonous exercises are over.

You have no excuse for not getting started toward musical good times now! For through an easy method you can now learn to play right at home—without a teacher—for a few cents a day.

Learn to Play by Playing

The lessons come to you by mail from the famous U. S. School of Music... complete instructions, clear diagrams, and all the music you need. You learn to play by playing real tunes by note. First you are told how to do a thing. Then a picture shows you how. Then you do it yourself and hear it. Remember, don't confuse our method with any system claiming to teach music "by ear" or by trick methods. We teach you to play only from real notes!

SUCCESS!

Here's what one of our thousands of pupils writes: "I learned more from your course than many of my friends who studied under private teachers have for years. The fact that I've already taken 2 courses and am now enrolling for a third should speak for itself." F. A. S., Indiana.

Here's what one of our thousands of pupils writes: "I learned more from your course than many of my friends who studied under private teachers have for years. The fact that I've already taken 2 courses and am now enrolling for a third should speak for itself." F. A. S., Indiana.

Don't delay. Send now for big 36 page illustrated Free Booklet and "Print and Picture" Sample which fully explain this remarkable method. So decide which instrument you want to play and mail the coupon today. U. S. School of Music, 87 Brunswick Bldg., New York 10, N. Y. (Successful 52nd Year)

FREE! Print and Picture Sample

U. S. School of Music, 87 Brunswick Bldg., New York 10, N. Y.

Please send me Free Booklet and Print and Picture Sample. I would like to play instrument checked below.

<input type="checkbox"/> Piano	<input type="checkbox"/> Saxophone	<input type="checkbox"/> Modern Elementary
<input type="checkbox"/> Guitar	<input type="checkbox"/> Trumpet, Cornet	<input type="checkbox"/> Harmony
<input type="checkbox"/> Hawaiian Guitar	<input type="checkbox"/> Pipe, Reed Organ	<input type="checkbox"/> Mandolin
<input type="checkbox"/> Violin	<input type="checkbox"/> Tenor Banjo	<input type="checkbox"/> Practical Finger
<input type="checkbox"/> Piano Accordion	<input type="checkbox"/> Clarinet	<input type="checkbox"/> Control

Name..... Have You Instrument?.....

Address.....

City..... State.....

Save 2c—Stick Coupon on Penny Postcard

Only \$498 8-HP



OTTAWA Mule Team Tractor

7 Riding Models

Famous OTTAWA MULE TEAM and CHIEFTAIN

series. Sizes from 5 to 20 HP. Engineered for longer life. Each model outstanding in performance, economy and lowest factory-to-user prices. Thousands in use. All have auto steering and excellent working visibility. Plenty of implements for plowing, mowing, planting, discing, harrowing, etc. 5-HP OTTAWA CHIEFTAIN shown at lower right has shortest turning radius of any riding tractor. Priced only \$342. OTTAWA



WALKING TRACTOR shown at lower left pays for itself in short time. Complete less tools only \$119. Write for FREE details on all models. Big demand. Rush inquiry today.



OTTAWA MANUFACTURING CO., 1-001 Garden St., Ottawa, Kans.

YOUR "DREAMHOUSE"



ALREADY PLANNED FOR YOU

You will find it in the brand new HOME PLAN BOOK of the Home Building Plan Service.

This new book contains plans never before published. You will find the house of your dreams among the many plans, which include starter homes, small homes, and large homes, in a wide variety of contemporary and traditional designs for both frame construction and block masonry. \$1.00 for each book. No C.O.D.'s please.

Complete working blueprints are available for any home illustrated in the Home Building Service Plan books.

HOME BUILDING PLAN SERVICE

2454-P NE Sandy

Portland 12, Oregon

BLISS Electrical Training

ELECTRICAL SCHOOL

Intensive 32 weeks' residence course in fundamentals of industrial electrical engineering, including radio and electronics. Extensive laboratory, shop work, drafting. Prepares for electrical technician and engineering aides in

communications, power, manufacturing, business machines, sales, service. G.I. approved. 57th year. Enter September 5. Catalog. 7612 TAKOMA AVENUE, WASHINGTON 12, D. C.

AMAZING NEW 1950

Powell P-81

NOW 4 BEAUTIFUL COLORS



10 HP AT 3400 RPMs! Thrill to 50 mph cruising—faster pickup than a car. AUTOMATIC CLUTCH with Powermatic Drive gives sensational per-

formance No gears to shift! Safe, smooth Brakes—50 miles per gallon—Length 71"—Height 41"—Weight 196 lbs.

POWELL MANUFACTURING CO. Dept. P5-750, Compton, Calif.

DEALER INQUIRIES INVITED

ONLY \$289⁴⁴

AT COMPTON, CAL. INCLUDING EXCISE TAX

WRITE FOR FREE FOLDER AND NEAREST DEALER

JULY 1950 37

DIESEL MECHANICS NEEDED BIG PAY . . . GOOD FUTURE



If you have no trade or profession that assures you steady employment and top pay through good times or bad, and regardless of whether you want to be a mechanic, technician, salesman, executive — or have your own profitable shop—you should investigate NOW this opportunity to enter world-famous Bailey Diesel Schools. Prepare yourself, this proven way, for an important place in the fast growing field of Diesel.

Why Gamble With Your Future!
Your future success depends largely on the reputation of the school you attend. Don't take chances! Train at Bailey's—America's foremost school of diesel training. Approved by Missouri State Board of Education. Approved, also, for G. I. Training. Full details FREE. Return coupon below NOW.

MAIL TODAY FOR FREE CATALOG

BAILEY DIESEL SCHOOLS
1655 So. Grand Blvd., St. Louis, Mo.
Please Send Me Your FREE Catalog.

Name

Address

Town State

☐ Veteran ☐ Non-Veteran

Resident Training ☐ Home Study ☐

SPECIAL OFFER to Hobbyists

ONLY
4⁹⁵

Hard Angle Jobs Set-up in 5 Seconds

Save TIME! MONEY! Drill, mill, grind, etc., round, square, irregular pieces at any angle—Quickly—Easily—Accurately with **PALMGREN "HOBB-E" ANGLE VISE**. Accurately machined and graduated. 1 1/2" Jaws. 1-Plain. 1-Grooved. Order NOW! Only \$4.95. Write for "Hobb-E-Tool" Circular.

CHICAGO TOOL & ENGINEERING CO.
8396 SOUTH CHICAGO AVE. CHICAGO 17, ILL.



CAR WASH—3c!

With Amazing New

"WIZARD" Car Washer

**SALESMEN! \$30 a Day
On Only 15 Orders!**

Connect "WIZARD" Car Washer to hose and turn on water. Water flows over Cleaning Detergent and Water Softener Tablet in hose coupling. Detergent saturated water flows through 3-ft. aluminum handle and then through millions of tiny pores in Foam Rubber Pad to create thick, foamy suds that remove every trace of dirt, grease, grime and road-film like magic in 1/3 the usual time. No sloshing. No splashing. A professional washing job in record time without getting your shoes or clothes wet!



No Soap
No Pail
No Sponge
No Chamois
No Rinsing

**Car
Shines
Like New
in 1/3
Usual Time**

\$4⁹⁵
Retail

FREE! Rush Name for Demonstration Offer

Don't send a penny—just your name on a penny postcard for complete information and big illustrated circular. Tells all about "WIZARD" Car Washer and how salesmen are chalking up phenomenal earnings with this new lightning seller.

GET SAMPLE.

For quickest possible action, send only \$2.95 for Sample Demonstrator that retails for \$4.95. This Special \$2.95 price is for first Demonstrator only. No more available at this Introductory Price. If you don't want Demonstrator, send name only. But hurry. Be first in your locality with the biggest money-maker of the year.

MILLER MFG. CO., 812 N. Wells St., Dept. 47, Chicago 10, Ill.

ELECTRIC SIREN



6 volt. Complete with push button... **\$10⁹⁵**

"HOT ROCKET" Illuminated Ornament



Chrome Plated
Terrific
Value at
\$6.50

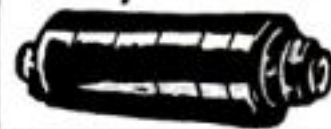
Five Red luminous Plastic fins whirl, looking like jet propulsion in action. 9 inches long, has internal lights. Metal parts are gleaming chrome.

Illuminated Chrome Plated Deluxe Fender Fins



Get that Cadillac look! For 1949-50 Chev., Ford, Pontiac, 1950 Plym., Dodge, Chrysler, DeSoto. Red reflector lens. Contoured to fit rear fenders perfectly. PAIR... **\$9⁹⁵**

Hollywood Mufflers



FOR
ALL
CARS

Gives that Motorboat Tone. Universal type to fit all cars. Each... **\$4⁴⁵**

NEW CONVERTIBLE TOPS & REBUILT MOTORS for all Cars. Write for Prices.

SEND 25% CASH WITH ORDERS. BALANCE C.O.D.

JUST OUT! Get the largest Auto Accessory & Parts Catalog in the world. Over fifteen thousand items, including Hollywood Accessories, Hi-Speed Equipment, Rebuilt Engines, all parts & accessories for all cars & trucks. We have that Hard-to-Get Part! Completely illustrated. Jam packed with bargains. Send 25c.

J. C. WHITNEY & CO.

1917-M ARCHER AVE.

CHICAGO 16, ILL.



G. I. DIVERS!

Don't let your training go to waste. Commercial Divers earn up to \$80 a day.

In your spare time you can do odd jobs—clean pools or tanks, retrieve golf balls or outboard motors, locate sunken boats, etc. Very LOW COST complete Gov't surplus EQUIPMENT available—either deep water or shallow water. Catalog 15c on request

Other marine surplus — sextants, barographs, bells, life preservers, M & T barge units, anchors, etc.

M & E MARINE SUPPLY CO. P. O. BOX 601-G
CAMDEN, NEW JERSEY

TEACH DRIVING

Full Time or Part Time

Dual controls for your car, easily and quickly installed. Very economical. How to teach driving and operate a profitable business. Special controls and testing devices for schools or groups. Write for information. No obligation.

NATIONAL DRIVING SCHOOL

P. O. BOX 1381

WILMINGTON, DELAWARE

Wood Carving

AND

Whittling

AN ARTISTIC HOBBY FOR ALL

This new manual shows you how to do every kind of wood carving. How to carve jewel boxes, picture frames, trays, chests, furniture, etc. How to do chip carving, level surface carving, incising, carving in relief. Carving human and animal figures in the round completely explained and simplified. 256 Pages. Fully illustrated,—full cloth bound. Send only \$2.00 and your copy will be sent postpaid, or order COD plus postage if you wish. *Money back if not satisfied.*

Popular Science Monthly

353 - 4th Ave.

Dept. 750

New York 10, N. Y.

TUNE UP Your Car Engine with HI-REV NOW!

WORLD'S FASTEST PENETRATING OIL!

Marvel HI-REV is a GUM SOLVENT... its use will permit sluggish engines to regain their high standard of performance. It frees sticky valves and improves compression. Add one pint to gasoline tank for jet cleaning. One pint in radiator cleans rust from water jacket and radiator core.

HI-REV SUPREME AS TAR & ROAD OIL REMOVER

Excels any known product in freeing rusty nuts and bolts. Lightning fast on pipe joints and oil well fittings. Of great value in boat yards and around salt water... loosens rusty threaded connections easily. Will not produce rust or corrosion of any kind. Simple to apply in a stream from pint can by reversing cap spout. Made by the makers of famous Marvel Mystery

Oil. Emerol Manufacturing Co., Inc.,
Dept. PS, 242 W. 69th St., New York
23, N. Y.

**WRITE
NOW!**



EMEROL CHASSIS OIL

A waterproof Lubricant for all chassis work. Clings, penetrates and protects against rust, despite hard rains. Will not affect car finish in any way.



Earn Dollars in WATCH REPAIRING



Experienced watchmakers earn \$2500-\$5000 a year and up. Learn the "Sweazey Way" from 42-year-old school. Send today for FREE SAMPLE of Home Study watchmaking course.

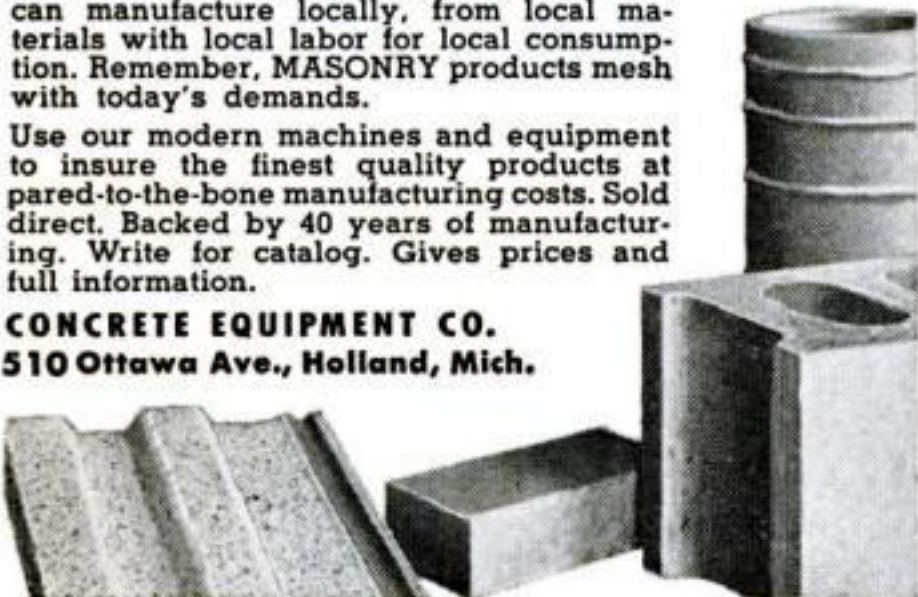
GI approved resident courses also available. Write now. **CHICAGO SCHOOL OF WATCHMAKING** Dept. 470
1608 N. Milwaukee Avenue Chicago 47, Illinois

Manufacturing Opportunities in Concrete Products Industry

The great building industry is your profitable market for masonry products. Low investment... high returns... wide-open opportunity to establish a lifetime business. The biggest building years in the nation's history are just beginning. New construction, involving billions of dollars, means huge demands for block, drain tile, and other masonry products which YOU can manufacture locally, from local materials with local labor for local consumption. Remember, MASONRY products mesh with today's demands.

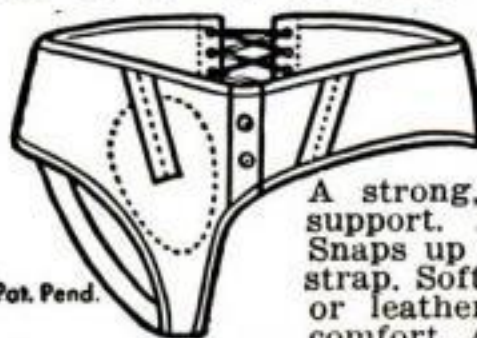
Use our modern machines and equipment to insure the finest quality products at pared-to-the-bone manufacturing costs. Sold direct. Backed by 40 years of manufacturing. Write for catalog. Gives prices and full information.

CONCRETE EQUIPMENT CO.
510 Ottawa Ave., Holland, Mich.



AMAZING COMFORT—NO SPECIAL FITTING

RUPTURE - EASER



Right or Left Side **\$3.95**
Double 4.95

A strong, form fitting washable support. Back lacing adjustable. Snaps up in front. Adjustable leg strap. Soft, flat groin pad. No steel or leather bands. Unexcelled for comfort. Also used as after operation support. For men, women and children. Mail orders give measure around the lowest part of the abdomen. Specify right or left side or double. We Prepay Postage Except on C.O.D.'s.

10 DAY TRIAL OFFER

Money-back guarantee if you don't get blessed relief.

Piper Brace Company, Dept. PS-75, 308 E. 12th St., Kansas City 6, Mo.

Please send my RUPTURE-EASER by return mail.

Right Side ☐ \$3.95 Left Side ☐ \$3.95 Double ☐ \$4.95

Measure around lowest part of my abdomen is.....INCHES.

We Prepay Postage Except on C.O.D.'s

Enclosed is: ☐ Money Order ☐ Check for \$..... ☐ Send C.O.D.

Name.....

Address.....

City and State.....

RUSH THIS COUPON NOW!

JULY 1950 39

NEW Walton DRILL-SAWMATIC

Converts any Electric Drill into a

HAND or BENCH

S A W

- 15 day trial offer
- one hand operation
- for outdoor or indoor sawing
- fits any electric drill up to 1/4" chuck
- has 4" steel blade
- converts into bench saw

NEVER BEFORE AT
THIS LOW PRICE

\$9.88
post paid

CONSUMER TESTED and APPROVED

The new, sensational WALTON DRILL-SAWMATIC, a precision engineered rugged tool, at lowest price ever. Fits any electric hand drill, up to 1/4" chuck, (adjustable) cuts wood, wall-board, plaster from 1/16 to 1 1/2" thick. Has lubricated concealed gears and oil impregnated bearings. Operates with one hand as other guides material. For hand or bench use.

ORDER BY MAIL TODAY and SAVE!

Satisfaction guaranteed. Payment with order saves C.O.D. charges. If not the finest tool you've ever tried, return within 15 days.

FACTORY GUARANTEED

WALTON TOOL CO., Dept. PS-75D

159 E. Chicago Ave.

Chicago 11, Ill.

Does EVERY
SAWING JOB:

- Easier
- Faster
- Electrically

CUTS—

- Plywood
- Wallboard
- Shelving
- Plaster
- 2 x 4's

MAKE BIG MONEY!

Be a floor surfacing contractor and sand both new and old floors. Sanders are easy to operate and better still, you're your own boss. Write for latest "tell-all" booklet entitled "Opportunities In Floor Surfacing" enclosing 25 cents in coin or stamps to cover handling.

AMERICAN
FLOOR SURFACING MACHINE CO.
332 So. St. Clair Street • Toledo 3, Ohio

TRI-STATE COLLEGE

FOUNDED 1884

Time tested, world famous accelerated B.S. Degree courses in Civil, Elect., Mech., Chem., Aero., and Radio and Telev. Engineering; Bus. Adm. and Acct. May be completed in 27 months. Also 36 weeks courses in Surveying, Drafting. For ambitious, earnest students. Preparatory Dept. for those who lack required high school work. G.I. approved. Visit campus, see well equipped labs. Low cost. Personalized instruction. World-wide student body. Grads successful. Enrollment limited to 1600. Enter Sept., Jan., March, June. Write for Catalog.

570 College Avenue Angola, Indiana



**B. S.
DEGREE IN
27 MONTHS**
•
**World Wide
Enrollment**

World's Most Amazing Book of *Rare and Secret* Information!

The Book of Formulas

The basis of many fortunes! Formulas, recipes, methods and secret processes for making and improving upon beverages, glues, cements, enamels, paints, cosmetics, dyes, inks, tooth pastes, soaps, silver and nickelplating, oils, lubricants, and a thousand and one things for commercial and household use! Your fortune may hang upon one little hint from this most amazing of books! Information from a thousand sources—not normally available to the general public—now published for the enjoyment and practical profit of our readers.

See What You Can Make

You can easily make mixtures to keep your windshield shining like crystal, whiten discolored teeth, keep silverware bright and clean. You can make beverages, or power belt dressings, perfumes, shampoos, bleaches, photographic solutions, essences and extracts, manufacture battery fillers or solutions, and do a thousand other things—all with the plain and easily followed formulas in this book.

FUN and PROFIT for Experimenters

If you like experimenting with things, either as a hobby or as a serious vocation, here are modern formulas which, taken as a base, may lead you to unique discoveries and profits.

ONLY \$1⁴⁹
Deluxe Edition

Send No Money Now

Popular Science, Dept. 750

353-4th Ave., New York 10, N. Y.

Send me *The Book of Formulas*. I will pay postman \$1.49 C.O.D. plus few cents postage, upon delivery. Money back if not satisfied.

NAME.....

ADDRESS.....

CITY.....STATE.....

Personal To Women With Nagging Backache

As we get older, stress and strain, over-exertion, excessive smoking or exposure to cold sometimes slows down kidney function. This may lead many folks to complain of nagging backache, loss of pep and energy, headaches and dizziness. Getting up nights or frequent passages may result from minor bladder irritations due to cold, dampness or dietary indiscretions.

If your discomforts are due to these causes, don't wait, try Doan's Pills, a mild diuretic. Used successfully by millions for over 50 years. While these symptoms may often otherwise occur, it's amazing how many times Doan's give happy relief—help the 15 miles of kidney tubes and filters flush out waste. Get Doan's Pills today!

WANT \$10,000?

Earn the government bonus. Locate Uranium with a **GEIGER COUNTER**

Find gold, silver, and other valuable ores with a P.R.I. Treasure Locator. World's finest instruments. FREE catalog.

Write today.

PRECISION RADIATION INSTRUMENTS, Inc.

5478 PS Wilshire Blvd., Los Angeles 36, Cal.

Dealer Inquiries
Invited



\$ FREE COURSE! BIG PROFITS! \$

Flocks & Sandblasts

Dual Purpose Spray Gun! Uses only 25 lbs. Air Pressure!

• Thousands of uses in Home, Shop, Industry: Makes Auto Interiors Clean & New, Lines drawers, Marproofs lamp bases, Refinishes any object. All in colorful Flock, Etch & Frost windows, glassware, etc. Removes Paint & Rust from Autos, Tools. Guaranteed! Send \$19.75 or write for free information. Complete Flocking Supplies!

BLASTO SPRAY GUN MFG.

Dept. PS-7, 7007 Haas Ave., Los Angeles 47, Calif.



Only
\$19.75
complete

NEW! MINIATURE DUST MASK

Wear when sanding, grinding, paint spraying, sweeping, dusting, furnace cleaning, etc. Handy as a pair of glasses. Just keep mouth closed and breathe through nose is all you do to operate. Protects against dusts, lint, coal, cement, grain dust. Has 9 sq. in. filter.

Order today.

JERRY BRYANT, Dept. PS, 919 N. Michigan Ave., Chicago 11, Ill.



Order
Today \$1.00
POST
PAID

Texas Ranger Slingshot



For hunting or target shooting. Your choice—sawed oak (left) or natural mesquite fork (right)—\$1.00 postpaid, with extra bands and pellets.

LEWIS ELLISON, DEPT. A,
BOX 352 VAN HORN, TEXAS



100 ALL STAR MODEL POSES



**GORGEOUS PROFESSIONAL
MODELS IN 100 POSES ON
16 MM FILM STRIP**

Superb camera studies of 100 thrilling beauties. Ideal for discriminating sculptors, artists, art students, photography students. Add 10c for postage. Order Now!

\$1.00

FULL
SIZE
PROJECTOR
UP TO 4' x 6'
\$10 Value
Now \$4.95 post-
paid

Magnify-
ing viewer
for per-
fect detail \$1

BENEFIT CORP., Dept. A-27
3807 Benefit Street,
Baltimore 24, Md.



OVER 500 SURPLUS BARGAINS



**CLINTON
ENGINE**

1 1/2-2
H.P.

WAS 59.50
ONLY
39.95

BRAND NEW!

In original factory cartons. 4 cycle, complete with gas and air filter, starter rope, etc. Parts manual and factory warranty included. Dependable power for mowers, saws, generators, etc. 37 lbs. (Sent express collect)

ALL PURPOSE

PUMP

• INSECTICIDES • BAILING
• FIRE FIGHTING • CAR WASH
• WHITE WASH • BILGE PUMP
• BRAND NEW! etc.

NEW! Finest quality, easy working! Ruggedly built of all metal, wood grip! Complete with 10 ft. flexible hose, spray nozzle. Approx 27" high. ADD 25¢ POSTAGE



149

Nylon JUNGLE HAMMOCKS

Brand new hammocks. bug free! Fine mesh. Complete with ropes. Insect-proof, rot-proof and genuine Nylon net sides. hanging rings, etc. Govt. cost \$14.00, only 4.98



LIFE RAFTS

**\$12.95
UP**

SCARCE!
AIR FORCE RAFTS
IN SIX TYPES

Complete with oars, pumps, case, etc. (except C-1 TESTED — IN PERFECT CONDITION!)

Type	C-1	PK-1	C-2	Mark II	A-3	E-2
1 Man	12.95	16.95	19.95	34.95	39.50	44.95

SURPLUS
BARGAINS
SEND
10¢

for NEW! Spring and Summer Catalog

Over 500 surplus BARGAINS in sporting and camping goods, clothing, tools, etc. Write for Your Catalog Today!

FISLER SALES CO. 723 WALNUT
KANSAS CITY 6, MO.

High School at Home

Many Finish in 2 Years

No classes. No time wasted going to and from school. Progress as fast as your time and abilities permit. Standard H. S. texts supplied. Thousands enroll each year in this 52-year-old school. Send for FREE descriptive booklet.

AMERICAN SCHOOL, Dept. HB46
Drexel at 58th St., Chicago 37, Ill.

Without obligation, please send FREE descriptive booklet.

Name.....

Address.....



**I HELPED T.E.H. MAKE \$14 A DAY
WHILE STILL LEARNING!**

T. E. H.—West Virginia. "By the time I finished half your course, I was making \$14.00 per day. I have made enough on the side to more than pay for the course."

H. T. ARMSTRONG

Learn **ELECTRIC APPLIANCE** REPAIR & SERVICE

WE TEACH:

How to Repair
Washing Machines
Vacuum Cleaners
Electric Ranges
Lamps, Motors,
Irons, etc.,
REFRIGERATION
and
House Wiring
At Home
In Your
Spare Time!

For a man handy with tools, and happiest when working with his hands, OPPORTUNITY is Wide Open Today in this great and growing field. Everyone is a customer for the man trained to service electric appliances.

Open Your Own Shop

Our practical HOME COURSE teaches you this business from A to Z—preparing you to take a well paid job or open your own shop. You can actually start in your basement or garage with the tools we send you . . . before finishing.

We
Include An
**ELECTRICAL
APPLIANCE
TESTER**
A Big Kit of Tools
at NO EXTRA
COST

MAIL THIS COUPON for FREE BOOK

**H. T. ARMSTRONG
PACIFIC TRAINING SCHOOLS**

7217 So. Broadway, Dept. S-507 Los Angeles 3, Calif.

Dear Sirs: Please send me, without obligation, your free booklet and complete details.

Name _____

Address _____

City _____ Zone _____ State _____

POWER MOWERS & KITS

**FREE
PLANS**



**LOW FACTORY PRICES
DIRECT TO YOU** on
America's finest Lawn Mowers and
Easy-To-Assemble Kits and Parts.
TRIANGLE Mowers are quality-
built and powered high for
easy cutting and long wear.

SAVE MONEY 3 WAYS

1. Buy complete assembled mowers in 3 or 4 wheel models, 18" and 20" sizes.
2. You assemble complete mower from our precision built Kits and Parts.
3. Build your own from our FREE PLANS using Triangle Kits, Parts, Engines, Wheels, Etc.

WRITE TODAY for full
facts, Free Plans, Parts
List, and LOW Factory
Prices.

TRIANGLE MFG. CO.
Dept. SF, Box 185
Fort Scott, Kansas



PAINTERS' STRIPING TOOL

Easy to use as a pencil! Draws parallel lines, straights, curves, circles with paint, enamel, lacquer, etc. Do your own striping on autos, furniture, toys, bikes, model planes, signs, linoleum . . . make wall board look like tile. Painters—craftsmen, order today! Type "M" Master Painters' Striping Tool complete with tip for 1/16" stripe, \$1.00. Other tools complete with following tips: 1/64", 1/32", 3/64", 5/64", 3/32", 1/8"; \$1.50 ea. Extra tips 75c ea. Entire kit with tool and 7 tips \$5.00. (COD's postage collect) **DEALERS WRITE!**

WENDELL MFG. CO.
4234-A Lincoln Ave., Chicago 18, Illinois

HOLLYWOOD MUFFLER

THE TONE YOU LOVE TO HEAR



MORE SPEED—POWER—MILEAGE

are yours with a Hollywood Muffler . . . plus a tone you'll love to hear! Not a gutted muffler. Easy to install.

Hollywood Muffler:
Trade-mark Reg.
U. S. Pat. Off.

Dealers
Write

IMPROVED
DESIGN
PRECISION MADE
ELECTRIC WELDED!

Outlasts ordinary mufflers 3 to 1

Ford, Chevrolet, Plymouth \$6.00

All other cars \$8.00

Duals, Ford & Merc. \$24.50. 3" Chrome Barker Tip, \$3.25. Order direct. Send check or M.O. and save postage.

TOM WILKINSON MUFFLER CO. 811 WILT STREET
FT. WAYNE, IND.



95 lb.
SET
\$10.80

Extra plates
10c lb.

BARBELLS

Save Money—Buy the finest barbell equipment direct from our foundry—No other company can match our low price or value!

Send to-day for our FREE Barbell Catalog

BUR BARBELL CO.

Lyndhurst K7, New Jersey

ENORMOUS PROFITS CASTING AT HOME

Write today for NEW FREE CATALOG

Learn to cast thousands of perfect figurines, plaques, book ends, ash trays, etc. Start NOW—NO EXPERIENCE, LITTLE CAPITAL needed. Earn GREAT PROFITS with X.L. RUBBER MOLDS. X.L. Rubber, Pts. \$2.00; Qts. \$3.50; Gallons \$8.95; Models and enough rubber for 3 molds . . . \$1.30 postpaid.

PLASTIC ARTS STUDIO

3403 S. Madison
St. Dept. 3
MUNCIE, IND.



FREE
FACTS
SENT

MAKE MONEY IN LANDSCAPING

Thorough training by Internationally known Landscape Architect to start your own business, improve your home or advance in this well paid field. Many Opportunities. Approved for Veterans. Send for FREE BOOK.

NATIONAL LANDSCAPE INSTITUTE
310 So. Robertson Dept. PS-7 Los Angeles 48, Calif.



BOX-TYPE—
STURDY
STEEL

PICNIC TABLE LEGS



Electrically-welded steel legs, ready-drilled. Simply apply your own lumber and it's complete. Send for Free literature!

Complete
for one table

\$7.95 Set
East Moline Metal Prod. Co.
Dept. S, East Moline, Illinois

BUY U. S. SAVINGS BONDS



LEARN HOW TO HYPNOTIZE

COMPLETE—ONLY \$1.95, POSTPAID! Amazing self-study lessons . . . in simple, easy to understand language. How to select a subject—how to hypnotize by telephone—how to make money from hypnotism—mental telepathy—stage hypnotism—self-hypnosis; how modern hypnotism is used to conquer inferiority complex, fear, battle fatigue, timidity, etc. Clear, helpful pictures show operating positions, movements. Money-back guarantee. Only \$1.95, postpaid—or COD, plus postage. Write today!

Nelson-Hall Co., 1139 S. Wabash Ave., Dept. 26-1, Chicago 5, Ill.

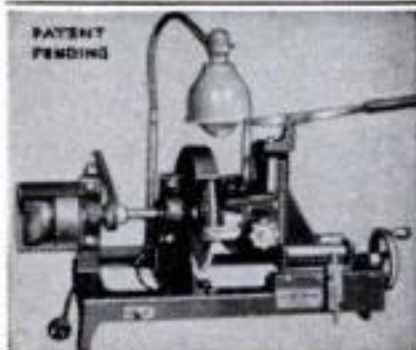
5805 East Beverly Blvd., Dept. A4, Los Angeles 22, Calif.

CHICAGO SCHOOL OF SHOE REBUILDING, Dept. PS-7
124 E. 26th Street Chicago 16, Illinois

Chicago 16, Illinois

We have taught thousands this exciting, profitable, pleasant profession. Let us teach you **in your own home**. Learn Finger Printing, Firearms Identification, Police Photography, Secret Service Methods thoroughly, quickly, at small cost. Over 800 of all American Bureaus of Identification employ I. A. S. students or graduates. We can prepare you for this fascinating work during spare time. Write today, stating age, for "Blue Book of Crime."

INSTITUTE OF APPLIED SCIENCE, 1920 Sunnyside Ave., Dept. 136-B, Chicago 40, Ill.



**or Add to your present
Repair Business**

SHARPEN DULL PIPE WRENCHES
PIPE TAPS & DIES
"GUM" CIRCULAR SAWS

Write for Information

J. C. MOORE INDUSTRIES
BOX 5 276, Fredonia, Pa.

Roy Williams, designer of the famous mosquito boat, flying tiger and sea-bee insignias. Twenty years a top artist with Walt Disney, now announces the opening of his own cartoon school. You've enjoyed Roy's cartoons in the New Yorker, Collier's and Post. Roy will personally analyze and correct your cartoons, together with new ideas and how to sell them. Send five dollars, together with your cartoons, for a three month course to
ROY WILLIAMS, 6411 Hollywood Blvd., Hollywood 28, Calif.

Why try to worry along with trusses that gouge your flesh—press heavily on hips and spine—enlarge opening—fail to hold rupture? You need the Cluthe. No leg-straps or cutting belts. Automatic adjustable pad holds at real opening—follows every body movement with instant increased support in case of strain. Cannot slip whether at work or play. Light. Waterproof. Can be worn in bath. Send for amazing FREE book, "Advice To Ruptured," and details of liberal truthful 60-day trial offer. Also endorsements from grateful users in your neighborhood. Write:

CLUTHE SONS, Dept. 14, Bloomfield, New Jersey

2500 WATT, AC, 115 Volt, 60 Cycle, Single Phase, ENGINE Briggs & Stratton, air cooled, 6 1/2 H.P. GENERATOR: Westinghouse or Leland, belt drive with guard and Duplex receptacle mounted. NET WEIGHT 310. Gross Shipping Weight 441. Shipping size 36" x 19" x 26". Included is \$30.00 worth of spare parts and tools. GUARANTEED. WAS FORMERLY PRICED AT APPROX. \$700.00. NOW **\$295.00** PRICED FOR YOU NEW AT ONLY.....

Reconditioned... \$210.00 Generator only, NEW... \$145.00
 5 KW, 120 Volts, 60 Cycle, AC, ENGINE Hercules 4 cycle, Gasoline,
 GENERATOR: Mfr'd. by Hobart Bros. Unit includes remote control and
 power cable on reels valued at \$89.00, exhaust pipe, power cable plug,
 remote control stop-start switch, automatic volt regulator, continuous
 duty 6.3 KVA at 80% power factor, frequency meter, radio and televi-
 sion filtered. Unit is completely automatic and cannot be damaged by
 lack of care. Net weight 770 lbs. Shipping weight 1070 lbs. 44" long,
 22 1/4" wide, 30" high, 220 volt output can be supplied on all units at a
 small additional cost. Guaranteed. Formerly PRICED
 AT \$1600.00. NOW PRICED FOR YOU AT ONLY **\$475.00**

Special offer to anyone purchasing either of the above units.
Ball bearing wheels and axle to make unit portable. \$30.00
value.....SALE \$10.00
Transformer make it 110-220, \$60.00 value....SALE 20.00
50' # 12 wire with connectors, \$28.00 value....SALE 4.00
100' # 15 wire with connectors, \$32.00 value....SALE 5.00

Electric driven. Hand power or use it as an electric hoist. BRAND NEW. Double reduction, sturdy construction yet light and compact. 80 to 1 gear ratio. Ball Bearing. A REGULAR VALUE OF \$74.50. Now priced at only \$28.95

SPEED REDUCER, Double reduction. 22 RPM. Made of aluminum alloy. Operates on 1/8 to 1/2 HP electric motor. REGULAR VALUE \$38.00. Now priced at only \$16.00

THERMO-MERCURY CONTROL. NEW. Mercury control adjustment. In panel case with 6 feet of copper control element. Mfg. Minneapolis Honeywell Company. **REGULAR VALUE \$16.00. Now priced at only \$3.00**

BRIGGS-STRATTON, Gas Engines. Model AP, 3/4" shaft, 134 to 2 1/2 HP, List \$102.00, Now \$59.50. Model Z2P reconditioned, guaranteed. Regular \$141.00, Now.....**\$79.50**
MERCURY CLUTCH, for motor-scooters, lawn mowers, etc. Use with electric or gas engine, List \$28.00, NOW only . . .

WRITE FOR FREE CATALOG listing thousands of Surplus bargains

C & H ELECTRIC CO.

436 W. JUNEAU AVE. MILWAUKEE 3, WISCONSIN

A black and white line drawing of a chef's head and shoulders. He is smiling and pointing his right index finger towards a fried egg served on a small plate. A fork is visible behind the plate, and a bowl is partially visible in the upper right corner.

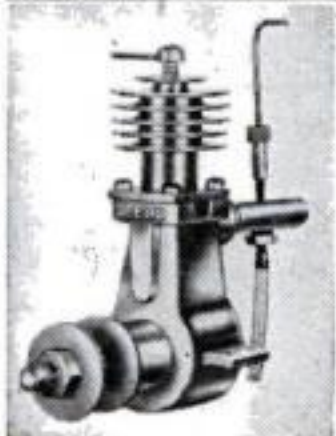
SAVE up to \$15.00 On Glasses

Big News to the Millions of Spectacle Wearers and Prospects. Means Freedom from Outrageous Prices. Perfect Satisfaction Guaranteed! No Risk!

**MAKE BIG MONEY QUICK
FREE SAMPLE KIT!**

Send for Free Sample at once. Show it to friends and others. Let them use it Free and watch their amazement over this new system of Self Testing. Here is a great new opportunity in a tremendous new field of unlimited possibilities. Spare or full time. No experience or capital needed. Act quick!

Clark Optical Co., Dept. A-151, 1148 W. Chicago Ave., Chicago 22, Ill.



★★★★★★★★★★★★★★★★

Our 284th Advertisement

REAL DIESEL ENGINE!

\$295
You can't beat this price!

- Ideal for planes, boats, midget cars
- Actually runs at 7300 RPM, produces 1/7 HP
- Precision machined for smooth operation
- Comes to you completely assembled, ready for operation.

MAYBE WE'RE CRAZY, giving away a precision diesel engine, complete with cylinder and piston, carburetor, crank-etc., for **ONLY \$2.95**. But we're selling all over the world, and that keeps our n. **DEEZIL** is streamlined, compact, easy to install, runs for years! Fast **DEEZIL TODAY!**

Send \$2.95 plus 25c postage

GOTHAM HOBBY CORP., Dept. S, 107 E. 126th St., New York 35, N. Y.

ENGINEERING DEGREE IN 27 MONTHS

Big Demand for Graduates

AERONAUTICAL, CHEMICAL, CIVIL, ELECTRICAL, MECHANICAL and RADIO ENGINEERING (including Television). Hundreds of young men are earning engineering degrees in this recognized institution each year—continuous operation. New terms start quarterly. Many students earn a major part of their college expenses in this large industrial center.

Low tuition. Competent instruction. Thorough intense, practical program. Modern laboratory facilities including new physics lab. and modernized wind tunnel. Individualized instruction emphasized.

Approved for Veterans. Engineering preparatory courses. Students from 48 states and 21 foreign countries. Enter June, September, December, March. Send coupon for free catalog and full information. Enroll now.

— SEND COUPON TODAY —

INDIANA TECHNICAL COLLEGE

670 E. Washington Boulevard
Fort Wayne 2, Indiana

Please send me free information on B. S. Engineering degree in 27 months as checked.

☐ Aeronautical, ☐ Chemical, ☐ Civil,
☐ Electrical, ☐ Mechanical, ☐ Radio-Television.

Name.....

Address.....

Learn RADIO TELEVISION ELECTRONICS

Train at home, in spare time, for a good pay job or a business of your own without capital—through our proven 2-Way method—lesson instruction PLUS actual practice with 10 big kits of radio parts. Helps you learn faster, more thoroughly. Many students earn money in spare time, while learning. Write for **FREE** book, "Your Opportunities in Radio, Television & Electronics," to **HOLLYWOOD RADIO & TELEVISION INSTITUTE**, (Established 1929) Dept. D-26, 810 West 6th St., Los Angeles 14, Calif. Approved for Veterans. Advise if eligible for G.I. training.

MANUFACTURE BUILDING BLOCKS

Easy to start your own profitable business. General high speed, low cost Concrete Vibrator Block Machine produces 1000 blocks in 8-hour day. All sizes and shapes. Complete details **FREE**. Mail \$1 for wonderful book, "How to Build Your Own Concrete Block Home."

GENERAL ENGINES CO.

307 HUNTER ST., S-10, GLOUCESTER, N. J.

Only \$199



CAR OWNERS! OIL FILTER REFILLS 10¢



Filters Oil the full length of the Pack

10,000 Sq. In. of Filtering Surface

Plates Last Indefinitely

Here's News! Ordinary toilet paper makes an ideal oil filter. Laboratory tests prove it cleans oil with amazing efficiency. All you need is a simple set of Retlif Adapter Plates...and you can start using toilet paper rolls (costing about 10¢) in your present oil filter. For proof and descriptive literature, send name and address to:

RETLIF CORPORATION, Dept. 53
1239 No. Highland Ave., Los Angeles 38, Calif.

DISTRIBUTOR INQUIRIES INVITED



BOOKS! BOOKS! BOOKS!

Unbelievable BARGAINS! SAVE UP TO 92%

Warehouse clearance sale—all brand-new books that sold originally for as high as \$11.95—now only 99¢ each! Only limited quantities available for each title. Send no money now unless you prefer to—clip Order Coupon below and mail **TODAY!** If not delighted, return books within 7 days for **FULL REFUND!**

#89. **HOW TO MAKE MONEY**—Small Store and Independence. Every phase of successful business operation. Was \$4.00. **NOW 99¢**

#133. **FUNDAMENTALS OF SHOPWORK**. Hand, power tools; blueprint reading, etc. Was \$1.75. **NOW 99¢**

#151. **FUNDAMENTALS OF FARMING**. 470 pgs. crammed with latest methods of earning money on your own farm. Basic guide; covers everything! Illus. Was \$2.50. **NOW 99¢**

#152. **CHILDREN'S PKGE. BRAVE BANTAM**. Delightful animal story. Illus. **BEAR THAT WASN'T**. Hilarious humor for young and old! Wonderful pictures! Were \$2.25. Both, **NOW 99¢**

#153. **FICTION PACKAGE. PRIVATE LIFE OF HENRY PERKINS**. Rollicking tale of a London dreamer. **MEN AGAINST THE ICE**. Adventure in the Arctic. Were \$3.50. Both, **NOW 99¢**

#210. **FUNDAMENTALS OF ELECTRICITY**. Covers all aspects of electricity! Illus. Was \$2.00. **NOW 99¢**

#225. **AVIATION MECHANICS SIMPLIFIED**. 576 big pages; 795 illus. Formerly a 4-volume set at \$11.95. 1 giant volume. **NOW 99¢**

#246. **MATHEMATICS**. Covers practical math; log. tables. Was \$2.50. **NOW 99¢**

#278. **NEW STANDARD POCKET DICTIONARY**. Handy-size; 50,000 words; 1,008 pgs. Illus. **NOW 99¢**

#283. **BOATS ANYONE CAN BUILD**. Easy plans for building craft from canoes to cruisers! Illus. DeLuxe edition. Was \$3.50. **NOW 99¢**

#307. **HOW TO TAKE CARE OF YOUR HOME**. Covers all home repairs. Illus. Was \$3.00. **NOW 99¢**

#309. **BUILDING OR BUYING A HOUSE**. Money-saving tips on everything from selecting site to financing. Was \$2.75. **NOW 99¢**



MAIL TODAY!

FOREMOST BOOKS, Dept. 750, 353 4th Ave., N. Y. 10
Please send C.O.D. books circled below. On delivery, I will pay postman 99¢ each plus shipping charges. Books may be returned within 7 days for full refund.

#89 #133 #151 #152 #153 #210
#225 #246 #278 #283 #307 #309

NAME.....

ADDRESS.....

CITY & ZONE.....STATE.....

☐ Check here if you remit with coupon, and we will pay postage. Same return privileges.

LEARN MEAT CUTTING AT NATIONAL

Pay After Graduation



The steady dependable trade of Meat Cutting taught easily in 8 short weeks. You LEARN BY DOING under actual meat market conditions in big modern school at Toledo.

For beginners or men with experience. Get a profitable store of your own. Remember, PEOPLE MUST EAT! Big pay jobs. Free employment help. Thousands of successful graduates.

Buying, cutting, percentage, pricing, advertising, selling, etc. A complete retail meat education. National School established over 25 years. Get National training NOW. Pay your tuition in easy weekly payments

after you graduate. G. I. approved. Send coupon for FREE 52 page school catalog—TODAY.

National School of Meat Cutting, Inc.
Dept. 51-G, Toledo 4, Ohio

Send me your FREE school catalog on National Training at Toledo in Meat Cutting, Meat Merchandising and Self Service Meats. No obligation. No salesmen will call.

Name.....

Address.....

City..... State.....

() Check here if Veteran of World War II

BRAND NEW CAPSTAN WINCHES

NEW LOW PRICES



6000 lb. capacity. Accurately machined gears provide for smooth efficient operation. Suitable for both front or rear mounting. May be used on amphibious jeeps or trucks. All units are brand new and fully guaranteed.

6 or more
\$15.00
ea.

Each
\$17.50

FRONT DRIVE POWER TAKE-OFF MOUNTING PARTS

Includes the essential parts needed to install the power take-off. Includes mounting bracket with pulley, universal joint & control clutch, double pulley for mounting on crankshaft, drive shaft, dash control rod and extra belt. Price complete, less winch, only.....

\$17.50

BIG, FREE CATALOG WRITE FOR YOUR COPY TODAY

Thousands of other parts and accessories available. SHOP BY MAIL—Order direct from this ad today.

BERG TRUCK & PARTS CO., INC.

1603 So. Wabash Avenue, Dept. S-7, Chicago 16, Ill.

BUILD YOUR OWN POWER LAWN MOWER

THAT PULLS ITSELF STEERS ITSELF

WRITE FOR
FREE BUILDING INSTRUCTIONS

The Rite-Way
Mower
Attachment
Ball Bearing



AUTOMATICALLY

Now, all the work is taken out of mowing.

First, it was power to cut grass and weeds. Now in addition power pulls and steers the mower. Build your own power mower with all these special features or convert your old mower to pull and steer itself, with parts and instructions we furnish.



IT'S FUN TO BUILD

T & H MFG. CO., Dept. MSB-6
811 E. 31, Kan. City 3, Mo.

SANDEE CHROME SILENTIP®



\$2.95
EACH

FOR QUIETER PERFORMANCE

An exhaust tailpipe extension that is actually a small muffler. Chrome plated. Will make a sport muffler or dual set quieter and still give straight thru performance.

SANDEE MUFFLER CO., 5643 Corryne Pl., Culver City, Calif.

Be an AUTO MACHINIST

Draw Top Pay—No Job Worries

Be a high-paid auto machinist! Specialize—make more money. New FREE booklet tells how to prepare for good jobs as an auto machinist or auto mechanic. G. I. Approved School of Auto Mechanics.

FREE: Write for your FREE booklet today.

AMERICAN TRADE SCHOOLS
2407C McGee Street, Kansas City, Mo.



GOVT. COST

~~\$81.25~~



NOW \$19.75

CHRONOMETRIC TACHOMETER

U. S. NAVY SURPLUS—ACCURACY—PRECISION—GUARANTEED

For PRECISION timing of all rotating mechanisms. Incomparable GUARANTEED ACCURACY of 1/10 of 1%. An RPM counter and surface speed indicator combined with chronometric operation which AUTOMATICALLY computes period of test in EXACTLY 6 SECONDS. No stop watch or personal equation necessary. UNSURPASSED for cameras, projectors, generators, motors, sanders, turbines, saws, shafts, looms, fans, lathes, etc. Packed in plush-lined, simulated leather case. UNCONDITIONALLY GUARANTEED subject to your inspection and approval. Manufactured by JAEGER and TOTCO, leaders in field of exacting measuring devices. Only \$19.75 Shipped postpaid in U.S.A. on cash orders.

ASTROGRAPHS

New in plywood cmpt. case. 14 1/2 x 11 x 10". Instrument adaptable for many useful gadgets. Govt. Cost \$300.00. Now **\$2.95**. 7 rolls Astrograph film add \$1.50

COMPASS

Mark IV Self-Compensating Floating Compass. U.S. Navy. 3 1/4 x 3 1/2 x 3 1/4". For car, plane, or boat. Govt. Cost \$72.00 Now **\$4.95**

A-10 Bubble SEXTANT

Never before at this price! Complete with hardwood case. Gov't cost \$300. Now..... **\$7.95**

Kohlsman ALTIMETER



Ideal for Auto or Airplane. Used but GUARANTEED accurate. Don't wait. Order NOW! Original gov't cost, \$168. Each **\$10.95**

Order these surplus bargains today. We pay postage on cash tachometer orders. Add postage to other items. 20% dep. on C.O.D.'s.

Semlers' ASSOCIATED SURPLUS Dept. P-70 5720 WILSHIRE BLVD., LOS ANGELES 36, CALIF.

Install a MILES PER GALLON & MOTOR TUNE-UP-GAUGE



in 1 minute

- ★ NEW
- ★ ACCURATE
- ★ GUARANTEED

Fits all cars—permanent. Checks spark plugs—checks carburetor and 31 other motor adjustments. Registers miles per gallon at every speed.

Simple to read—Dial in 4 colors. No holes to drill—anyone can install in 1 minute.

Complete instructions furnished.



DE LUXE MODEL CHROME PLATED
3 5/8" in dia. \$1295
GUARANTEED

SEND FOR YOURS TODAY—

GALE HALL ENGINEERING, INC.
DEPT. 130 BOSTON—18—MASS.
World's Largest Mfrs. of Auto Gauges

2 3/4" in dia.

ONLY
\$750
P.P.D.

Want to Get Ahead in Business? Get A BUSINESS EDUCATION!



Regardless of whether your aim is to specialize or generalize in your business education, this nationally known and approved school will gladly counsel with you. We offer you nation wide recognition and placement service as secretary, stenographer, accountant or salesman. Hill's offer both Resident & Home Study Courses. Write **FREE**

Dept. PSR today for Big 32 page SUCCESS BOOK

**Hill's BUSINESS UNIVERSITY AND
EXTENSION SCHOOL**
619 W. MAIN ST. OKLAHOMA CITY 2, OKLAHOMA

A Personal Invitation

FOR YOU TO
**Visit OREGON
This Summer**

It's a grand place to spend your VACATION . . . and while you're in PORTLAND be sure to visit the ADCOX SCHOOL where hundreds of students have learned DIESEL or Auto Body and Fender Repair under competent instructors in a few short months.

L. L. ADCOX
President

**ADCOX
SCHOOL**

237 N. E.
Broadway
PORTLAND 12,
OREGON

OPEN 12 MONTHS
OF THE YEAR!

WRITE FOR
FREE CATALOG No. 3



WAR SURPLUS BARGAINS

\$500,000.00 INVENTORY for
QUICK LIQUIDATION

Surplus items—hundreds of them for home, shop, factory, farm and outdoor use. New items, used items, reconditioned items—all at tremendous savings—all priced for quick sale.

PAGE AFTER PAGE OF VALUES

This big catalog shows page after page of amazing money saving values. Write for your copy today. Send 10c to cover postage, mailing, etc. Write today!

SEND TODAY FOR YOUR COPY

STARK'S

509 So. State St.
Dept. PS-7
CHICAGO 5, ILL.

10c

DRAINS CELLARS, WASH TRAYS CIRCULATES OIL



Pumps 1800 GPH 300 gal. 30' high, uses 1/8 to 1/2 HP **\$650**
motor. Will not clog.

Postpaid if cash with order.
(Add 50c for west of the Mississippi.)

Thousands in use since 1936

LABAWCO PUMPS, BELLE MEAD 3, N. J.

ALTIMETER



Modernize your car. Fine desk ornament. Reads up to 20,000 feet. Fluorescent dial glows at night—no connections of any kind required—self contained—Suitable as a laboratory standard instrument—Same as used in airplanes. Brand new—cost gov't many times **\$3.50**

Enclose sufficient postage—Excess will be refunded—No COD's

AIRCRAFT COMPONENTS, Inc.

960 Woodland Avenue Benton Harbor, Michigan

TRAIN



Your VOICE!

RESULTS GUARANTEED

STRENGTHEN your voice this tested, scientific way. Yes—you may now be able to develop the POWER of your speaking and singing voice in the privacy of your own room. Self-training lessons, mostly silent; no music required. Write TODAY for Eugene Feuchtinger's great booklet "How to Strengthen Your Voice." It's absolutely FREE! You must state your age. Booklet mailed in plain wrapper. No salesman will call. Send your name and age RIGHT NOW! Perfect Voice Institute, 1141 S. Wabash Ave., Studio G-1, Chicago 5, Ill.

EXPORT PAYS BIG

World Trade firm offers men and women plan for big pay positions or unlimited-profit businesses of their own in Export-Import. Mail order World-wide without capital, from home, or travel abroad. Write today for Free Book. State if veteran. Airmail reaches us over night The Mellinger Co., 1418-CU Westwood, Los Angeles 24, Calif.



BUY U.S.

SAVINGS BONDS



LAWN ORNAMENT-NOVELTY PATTERNS

28 Lawn Ornament Patterns, 25c. Other patterns: 15-20" high; Dutch Girl, Dutch Boy, Pirate, Bull Terrier, Mexican Girl, Mexican Boy, Dwarf, Penguin, Flower Girl. 10c each. 25 Novelty Patterns, 30c. All 62 Full Size Patterns, \$1.00 Postpaid.

FLYING DUCK

Wind revolves wings. Realistic appearance. Pattern, instructions and wing Pinion Kit; brass bearing, steel shaft, wing lugs, bolts, nuts and washers. 50c. Pattern and Instructions without kit, 25c. Postpaid.

STROTHER PATTERN SERVICE

Dept. 7-N

Box 128

Belington, W. Va.



SAVE with SAFETY the THORESEN way!

THORESEN'S IRONCLAD GUARANTEE PROTECTS YOU



WATER & SHOCK **8.80**
Resist Case—G. I. Style! no extras

Military Style! Drop it! Bang it! We guarantee it 3 years against any and all breakages—because of exclusive Swiss **INSULATOR** invention. 7 jewels. Luminous hands & numerals. Unbreakable crystal. Sweep-second. Heavy Chromed. Thin, smart! Marvellous accuracy. Long satisfying service. Tax paid, only... **8.80**
15 JEWEL Model tax paid—no extras... **14.33**
17 JEWEL Model (5 year guarantee!), As featured in Esquire. No extras!... **17.65**

Thoresen's 17 Jewel **29.88**
FULL AUTOMATIC no extras

De-Luxe model—fully automatic! Set it, then forget it! It winds itself as you wear it. Patented Incabloc. Anti-Magnetic. Sweep second. Luminous dial. **WATER & SHOCK** resistant. All stainless steel back case. 17 jewels. Near-miracle accuracy. Thin! Handsome! **5 YEAR GUARANTEE**. Formerly \$75.00. Thoresen's direct-to-you-price, only —29.88—no extras for tax. Rush! Supply limited!



Genuine ZIRCONS! MEN'S INITIAL RING

Something **SPECIAL** for men! Your initial in raised Gold Color Effect, set in a **Vermilion-Red stone**. Flanked by 2 **GENUINE ZIRCONS** imported from far-away **Siam**. Now yours for only **\$4.97**, yet it looks like **\$650.00** or more! Remember these are **NOT** imitations but 100% **GENUINE ZIRCONS** that sparkle with a **1000 rays of light**! Color and cut like precious diamonds. Real, honest value!

Any item sent on APPROVAL!

Send only sale price shown—no extras—for quick, insured delivery, or order **C.O.D.** plus postage. Complete satisfaction **GUARANTEED** or money back pronto.

THORESEN Direct Sales Dept. 7G-200

FREE 10 DAY TRIAL

Price promptly refunded if not thrilled within 10 days after receiving. Not a penny's charge for "handling," postage, parts or repairs on watches! **THORESEN** makes lifetime friends! References: Bank of Athens, New York, or any bank in America. Send check or money order. **C.O.D.'s** accepted plus postage.

THREE SYNCHRO DIAL Precision Made Swiss Chronograph

Outstanding value sleek handsome 3 dial chronograph. Amazing accuracy. Ideal for hobbyists, mechanics, scientists, doctors, sportsmen, students, aviators, etc. 20 **SUPER FEATURES**—3 Synchro Dials. 30 minute register. 1/5 second calibration, rugged shock-resistant case, sweep second, luminous dial. Built-in tachometer and telemeter measures speed and distance of planes, autos, horses, photos, etc. without stopping movement. 3 year guarantee. Formerly \$39.95. Now at slashed price of **\$14.95**. No extras.



14.95
no extras

131 West 33rd St., NEW YORK 1, N. Y.

BELTON SCHOOL of

TOOL DESIGN SPECIALIZED INDIVIDUAL TRAINING

Machinists, Tool and Die Makers, Mechanical Draftsmen and men with Mechanical Ability can improve their skill by training at Belton, the famous school that **SPECIALIZES** in teaching Tool and Die Designing and Mechanical Engineering Drafting. Reasonable Rates. Successful graduates, many making top money, prove success of the Belton Personal Assistance Plan. Individual Instruction. Progress as fast as your ability permits. Send for **FREE** fact folder.

BELTON SCHOOL, Dept. H-2, 2457 W. North Ave., Chicago 47, Ill.

BE A PHOTO-ENGRAVER

We furnish complete equipment and supplies. Learn at home or in our modern, friendly **APPROVED** school in **MISSOURI**. Get into this big demand, high profit, high wage field. You can start your own profitable, full time or part time **PHOTO-ENGRAVING** business right in your own home.

Be independent, be your own boss or pave the way to a high pay job with experience gained in your own shop.

TASOPÉ TRAINING and **TASOPÉ EQUIPMENT** has enjoyed world wide recognition since 1931. Write for descriptive literature today. No obligation.

THE AURORA SCHOOL OF PHOTO-ENGRAVING, DEPT. P5-7 TASOPÉ BLDG., AURORA, MO.

LEADING THE FIELD EVEN MORE THAN BEFORE

Mustang Lightweight Model "4"

Only
\$346.30

fed. tax paid,
at factory.



... imitated but never equalled. Original American high performance lightweight. Exclusive 3-speed Burman **GEAR BOX**. High output flywheel generator-magneto. Big cross-country seat. Telescopic fork. 9.5 h.p., 4-cycle motor. 60 m.p.h. plus. 70 m.p.gal. plus. Write **MUSTANG**, Dept. GP-44, 635 Colorado, Glendale 4, Calif. for free circular.

HIGHEST ROYALTIES and CASH

FOR YOUR INVENTIONS

(Patented and Patent Pending only)

Write for **FREE** booklet without obligation

UNIVERSAL MARKETING CO.

354 S. SPRING ST. (Suite C)

LOS ANGELES 13, CALIF.

HEED THIS NOTICE! Our Tires Are NOT Re-treads, Re-grooved or New Treads that have been re-capped. Our MATCHED tires give you SAFETY and ECONOMY — the BEST for LESS. You've seen our adv.



month after month for years. We serve TRUCKS, BUSES and CARS. OUT-OF-TOWN folks buy now and take off 20% discount. Our EXPERIENCE assures you the BEST BUY in good ORIGINAL TREAD Tires. One Quality — One Price.

Don't Send a Cent

Until you see our tires. Remember you get what we advertise. We ship only good USED original tread tires. A trial of one tire is worth a thousand words and will make you a satisfied customer. We guarantee a special personal selection of tires for you.

BUT IF YOU SEND CHECK OR MONEY ORDER IN FULL WITH THIS AD "NOW" — you may take 20% discount on every tire. SAVE TIME — SAVE MONEY

Tube given with each passenger & truck tire at no extra cost. Send this ad **WRITTEN GUARANTEE**—Sent with every tire you buy Customers everywhere report as much as 18 to 28 months service.

These are **** Original Tread Tires — OUR BEST Can be used for "Every Purpose" — No Re-caps or Re-grooved **READ THAT TOP NOTICE AGAIN AND SAVE \$ \$ \$**

600-16	\$5.55	650-16	\$5.95	700-15	\$5.85	475-19	\$5.95
600-16(6)	6.50	700-17	9.99	650-15	5.75	525-18	5.95
700-16	6.85	750-16	7.95	550-17	6.75	550-16	5.55

SUPERCUSHION TIRES (24 lb. air) to fit your present wheels
 670-15(650-15) \$6.25 760-15(700-15) \$7.45 670-16(600-16) \$6.66
 710-15(650-15) 6.85 820-15(700-15) 6.25 760-16(650-16) 7.50



WE SPECIALIZE IN TRUCK TIRES ****
 Matched Tires Shipped all over USA and Foreign Countries. IMMEDIATE SHIPMENTS Same Day. Depend on STANDARD for SERVICE. Roll along those EXTRA MILES without Delays and SAVE \$ \$ \$

600-20	\$9.95	32x6(8)	\$10.95	900-20\$16.66	1000-22\$16.66
650-20	9.95	32x6(10)	13.95	1000-20 17.77	1100-22 17.77
700-20	10.95	750-20(10)	13.95	1100-20 18.88	1100-24 18.88
750-20	10.95	825-20	17.77	750-15 11.45	700-17 13.33

MILITARY **** GRADE TRUCK TIRES

9.00-16\$12.22	7.50-20\$13.00
---------	--------------	---------	--------------

Thousands of Tires Shipped to Satisfied Customers Throughout United States and Many Distant Points. Remember Send This Ad with Check or Money Order to Dep't 5.

STANDARD 834 N. Broad St., Philadelphia 30, Pa.

LEARN TO MOUNT BIRDS



ANIMALS, FISH, PETS

Be a Taxidermist. Save your hunting TROPHIES. Have a fine home-museum. Hunters, save and MOUNT your beautiful DUCKS, QUAIL, DEER, TAN skins, FURS. Great Fun. Spare-time PROFITS. **FREE BOOK** Tells ALL about it. 100 fine wild-game pictures, 48 pages. SEND TODAY, don't delay. Get this WONDERFUL FREE BOOK, MEN AND BOYS. Learn Taxidermy. Double your hunting pleasure. Rush letter or POSTAL today. STATE YOUR AGE. **N. W. SCHOOL OF TAXIDERMISTRY, Dept. 2607, Omaha, Neb.**

HOUSE PLANS



275 BEST

DESIGNS — IDEAS — showing photographs of homes actually built; descriptions, floor plans, 1 & 2 story. All types architecture. Complete blueprint plans available. Circle your choice of books — 50c each:

- Selected Homes, 40 CALIFORNIA RANCH, Monterey.
- Dream Homes, 79 Illustrations, Interiors and Exteriors.
- Charming Homes, 31 5-Rooms, Modern Exteriors.
- Attractive Homes, 40 Cape Cods and Colonials.
- Small Homes, 23 Attractive "Budget" Designs.
- Brick Homes, 62 2-3-4 Bedrooms.
- ALL 6 BOOKS FOR \$2.50 POSTPAID



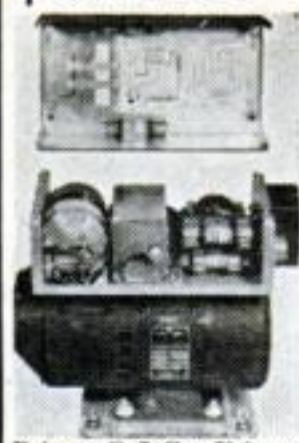
38 BARBECUE FIREPLACES 60c

Book Shows Photos — Plans

- ALL 7 BOOKS FOR \$3.00 POSTPAID No C.O.D.'s please. Money-back guarantee.

CLEVELAND PUBLICATIONS, INC.
 Dept. 7F 369 W. Washington, Pasadena 3, Calif.

\$300.00 FOR ONLY \$9.95



SOMETHING GOOD FOR THE HOBBYIST

Brand New Continuous Duty Precision Inverter Unit

INPUT 25-28.5 Volts D.C. OUTPUT 80 Volts—500 VA 800 Cycles

1001 Uses for this Fine Inverter that sells for \$300.00. Can be converted to suit your own needs or used for the many Electrical Parts it contains. This Unit has Electrical Parts galore, including: Filter, Condenser, Resistors, Voltage Regulator, Rectifier, Field Assemblies, Fuses, Starter Relay, Coils, and a Maintenance Handbook. Shipping weight 60 lbs.

Prices F.O.B. Chicago. Include approx. postage on orders paid for in advance. C.O.D. orders enclose 25%, balance sent C.O.D. WRITE FOR FREE ILLUSTRATED CIRCULAR.

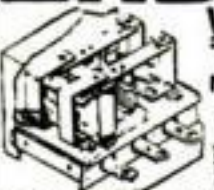
U. A. S. Corp. Dept. PS-7 5637 W. 63rd Pl. Chicago, Illinois

NERVOUS STOMACH

ALLIMIN relieves distressing symptoms of "nervous stomach" —heaviness after meals, belching, bloating and colic due to gas. ALLIMIN has been scientifically tested by doctors and found highly effective. World famous—more than a 1/4 billion sold to date. Money-back guarantee. At all drug stores.

ALLIMIN Garlic Tablets

END GENERATOR REGULATOR AND BATTERY- TROUBLE!!



REPLACE YOUR CAR VOLTAGE REGULATOR WITH A MAZING WATTAGE EMERGENCY DRIVE WITHOUT BATTERY GUARANTEE NEW SCIENTIFIC DEVELOPMENT!!! CHARGING RATE — HIGH FOR WINTER — LOWER FOR SUMMER — TO INCREASE OR DOUBLE THE LIFE OF YOUR BATTERY, GENERATOR AND BATTERY — TO KEEP BATTERY AT TOP CAPACITY AND GIVE YOUR CAR THAT TOP NEW CAR PERFORMANCE — STATE MAKE AND MODEL OF CAR AND SEND FOR FREE BULLETIN AND NOW YOU COULD ENJOY TROUBLE-FREE MOTORING

SCIENTIFIC ELECTRIC CO. CLEVELAND 8, OHIO P.O. BOX 2142-F

NO SWEAT



KEEPS WATER PIPES DRY
 No more dripping, sweating water pipes. Genuine Fiberglass insulation, covered with vapor seal tape. Easy to apply. Keeps basement dry—tools don't rust, even in hot, humid weather. Use on hot water pipes to cut heat loss. Neat installations. If dealer can't supply you, send his name and \$1.50 for enough to cover 20 ft. of 1/2" pipe. Postpaid. Satisfaction or money back.
NOTE: For root blocked sewers ask your dealer for DIG-NO-MORE. Folder on request. Dealers: Write.

ASSOCIATED SPECIALTIES, 10660 Gratiot, Detroit 13, Mich.



This can't happen WITH A Safety Ladder Holder

Avoid ladder accidents... use SAFETY LADDER HOLDER! Fastens in seconds to any roof gutter, and pitch or building side. Durable and weatherproof. Endorsed by casualty insurance companies. Send check or money order now!
only \$2.50 POST PAID Dealer inquiries invited

Dept. 5 LEWIS-SKINNER CO., New Boston, N. H.

Say You Saw It In Popular Science

Learn CRIME Detection!

Learn Scientific Criminology AT HOME. Opportunities in Investigation and Detective work—Identification—Finger Printing—Homicide Investigation—Infrared Photography—Photo-micrography for law enforcement. Send for FREE Book.

Institute of Scientific Criminology
 310 So. Robertson Blvd., Los Angeles 48, Calif. Dept. PS-7
 Name.....Age.....
 Address.....

Command Bigger Money! STUDY LAW

STUDY AT HOME for BUSINESS SUCCESS and LARGER PERSONAL EARNINGS. 40 years expert instruction—over 114,000 students enrolled. LL.B Degree awarded. All text material furnished. Easy payment plan. Send now for FREE BOOK—"Law and Executive Guidance." It explains the course—how you may enroll and the many ways you may profit from Law Study. Write TODAY to:

AMERICAN EXTENSION SCHOOL OF LAW
Dept. 28-PS 646 N. Michigan Ave., Chicago 11, Ill.

URANIUM DETECTOR! GEIGER COUNTER



M-Scope Type C-18
For Radioactive Mineral Prospecting
\$3500 Ready to Operate
FREE LITERATURE
FISHER RESEARCH LAB., INC.
PALO ALTO CALIF.

KINKADE GARDEN TRACTOR

and Power Lawnmower
A Practical Power Plow and Cultivator
for Suburbanites, Gardeners, Florists,
Estates, Fruit, Nursery & Poultrymen.
Easy Terms - Write Today
American Farm Machine Co.
1072 33rd Ave. S. E. Minneapolis, Minn.



FREE SAMPLES! GLOW IN THE DARK!

BIG PROFITS showing amazing Luminous Specialties—house numbers, pictures, plastic novelties, religious and nursery objects, ash trays, key-holders, etc. Large manufacturer. Enormous demand. Sell on sight. WRITE AT ONCE for FREE samples. Madison Mills, 303 4th Ave., Dept. L-5, New York 10, N.Y.

Rupture Troubles Ended

Advanced method has healed thousands. No leg straps, no elastic, no plasters. No pressure on hips or spine. Flexo-pad. Entirely different. Endorsed by doctors, mechanics, clerks. Very light. INEXPENSIVE. GUARANTEED. Write for information and trial.

SMITH MANUFACTURING COMPANY
EST'D 1893 Dept. PS, Preston, Ont. Can.



"It Measures As It Rolls"
ROLLER RULE
HANDY MECHANICAL PENCIL

Measures Curves and Straight Lines. Any Shape. Any Distance. Any Surface.

\$1.00
POST PAID

Roll head over surface. Inches and fractions record accurately on "Inch-O-Meter". Excellent pencil too! Order Now! 10 Day Money Back Guarantee! C.O.D. (postage extra). In Calif. add 3% Sales Tax.

PENCIL SALES CO.
Room 6, 1213 E. Ocean Blvd., Long Beach, California

C.T.C. TRAINING IN DRAFTING

PREPARES FOR
PROMOTION
MORE MONEY
SUCCESS



"Here I am at work making good money as a draftsman. I'm glad I sent the coupon to Chicago Tech for that Free Trial Lesson and found out how easy it is to learn Drafting in spare time at home. Today, I feel secure in my job. What's more, I feel I'm slated for promotion and more pay."

LEARN IN SPARE TIME—AT HOME!

(or at the College in Chicago)

A few hours of pleasant home study every week—that's all. All the tools you need; drawing outfit included. This tested method—developed over 46 years of C.T.C. progress—prepares men quickly for good position in industry.



FREE INFORMATION — SEND COUPON

To prove to you how easy it is to learn Drafting at home, we will send you this FREE TRIAL LESSON. Mail coupon or send post card today.

CHICAGO TECHNICAL COLLEGE

H-227 Tech Bldg., 2000 So. Michigan Ave.,
Chicago 16, Illinois

Mail me FREE Lesson with information about big opportunities in DRAFTING.

Name.....Age....

Address.....

City.....Zone...State.....

BEAUTIFIES
natural wood,
pine paneling

POLISHES
furniture,
woodwork

IMPROVES
paint jobs

PROTECTS
wood and
metal surfaces

49¢ 89¢
PINT QUART

101 HANDY HOME USES!
Every home, every workshop, needs Pol-mer-ik BOILED Linseed Oil. Free folder tells you how to use it. Write...
ARCHER-DANIELS-MIDLAND CO., Minneapolis 2, Minn.

BUILD A URANIUM LOCATOR! (GEIGER COUNTER)

GOVERNMENT NEEDS URANIUM!

Valuable undiscovered deposits may be at your finger tips! Find them with a Geiger Counter. Send \$1.00 for Big How-To-Build Plan . . . Describes easy, inexpensive construction and operation. No technical experience needed. This little locator may show you the way to wealth. Uranium and other needed metals are being discovered daily!

Send \$1.00 Today For Your Big Plan!

LEJAY MANUFACTURING CO.

223 LeJay Bldg., Minneapolis 8, Minnesota



DO IT YOURSELF with FOAM RUBBER

COVER YOUR FAVORITE CHAIR . . . CAR SEAT . . . KITCHEN AND DINING ROOM CHAIRS . . . IT'S EASY WITH FOAM RUBBER. MANY OTHER USES . . . **LOWEST PRICES.**

Auto Seat Topper Pads
24" x 60" x 1 1/2" . . . \$5.00

Bed Pillows
23 1/4" x 15" x 5" . . . \$6.95

Kitchen Chair Pads
12" x 12" x 1 1/2" . . . \$3.00 a set

in sets of 4 . . . \$3.00 a set
ORDER FROM THIS AD . . . SHIPPED PREPAID EXCEPT C. O. D.

WRITE FOR
FREE
GOV'T SURPLUS
CATALOGUE
AND
FOAM RUBBER
PRICE LIST

Other Sizes Each
15" x 15" x 1 1/2" . . . \$1.25
18" x 24" x 1 1/2" . . . 1.75
24" x 24" x 1 1/2" . . . 2.50

Sizes are approximate

Send 10c for Sample

BEN'S SURPLUS

764 KLEIMAN BUILDING

GRAND RAPIDS, MICHIGAN



ARGYLE Scooter Cub

FOLDS FOR CARRYING
UNFOLDS FOR RIDING
in 15 seconds!

Take it anywhere . . . weighs only 50 lbs. RIDES HEAVY-WEIGHTS—sturdy steel frame . . . ruggedly built. 100 MILES PER GAL. Speed to 25 MPH. Powerful engine. AUTOMATIC CLUTCH . . . positive brake. ONLY \$163.00 including storage bag. Order through your dealer or direct:

ARGYLE MANUFACTURING CO. COLCHESTER, ILLINOIS



Smiling at you from friendly shelves and pages

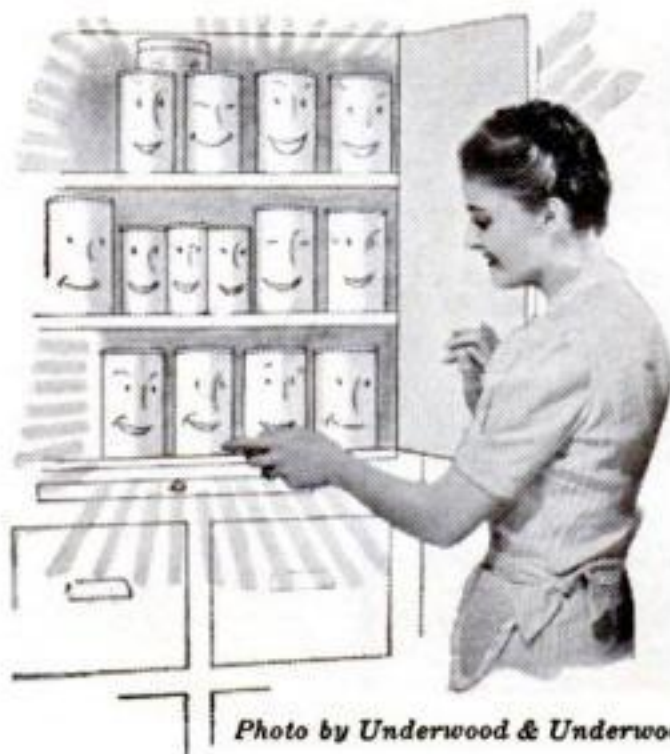


Photo by Underwood & Underwood

One of the many things that makes home the best place in the world is the array of old and trusted friends, always there to greet you . . . in the kitchen cabinet, the medicine chest and on the shelves of the household.

Every family has its coterie of favorite brands, familiar packages and products that have made life comfortable and enjoyable for many years. No two family assortments exactly match—and that is as it should be, since tastes differ. Your brand friends mirror your tastes and unique requirements.

The circle is by no means so ex-

clusive that new brands are not always welcome. Every so often another name joins the trusted group. You greet new candidates for your loyalty with open minds and a ready welcome if they "make good."

This magazine, too, is brighter for the messages of many of your old brand friends and quite a number of new ones asking for your friendship.

Brand Names Foundation

INCORPORATED

A non-profit educational foundation

119 West 57th Street, New York 19, N. Y.

Easy and Cheap to Operate

SAVE TIME, WORK, MONEY!

SHAW

"DU-ALL" and "PEPPY PAL" TRACTORS

These rugged walking or riding tractors are ideal for farm, truck garden, orchard, poultry farm. Operate on a few cents an hour. A child can handle them.

DO DOZENS OF JOBS Both riding and walking tractors quickly and easily plow, cultivate, harrow, disk, bulldoze, spray, haul, grind, saw wood, etc.

LOW FACTORY PRICES Buy direct or through your dealer. Year's guarantee!

RIDING TRACTORS 4 models from 5 to 12½ H.P., 58 in. wheelbase, 36 to 52 in. wide, 24 in. plant clearance. Hand or electric starter. Walking Tractors 1½ to 5 H.P.

FREE Illustrated folders giving complete details and price lists—write today!

SHAW MFG. CO. 5707 FRONT ST., GALESBURG, KANS. 668 PS NORTH 4TH ST., COLUMBUS, O.

HERE IT IS A MARVELOUS DREAM COME TRUE

the Man-from-Mars

RADIO HAT

COMPLETE WITH BATTERY PACK

\$8.50 Postpaid in U.S.A. GUARANTEED

Send Cash, Check or M. O.

THE COMPLETE 2nd RADIO BUILT INTO A HAT!

- Covers entire broadcast band within 30 mile radius
- Set weighs 3 oz., hat, 7 oz.
- Controls in lining ¼" thick
- Absolutely mobile, no extra aerial needed
- Regulation waterproof sun helmet—adjustable size

AMERICAN MERRI-LEI CORPORATION BROOKLYN 33, NEW YORK

Bar Bells

Buy Direct From Factory **\$8.95** up

Write for free booklet and price list

INDEPENDENT IRON WORKS
2416 East 23rd Street, Dept. C
Los Angeles 11, Calif.

PROJECTION SCREEN

Improved screen gives wonderful reproductions. It takes rough treatment—can be cleaned with water. Extra strong steel hanger, roller and tripod. This big value possible through volume production. Roller screen (with fixtures to hang it anywhere) only \$4.79 each postpaid. Tripods: \$2.49 each postpaid. Order yours today... satisfaction assured.

HANG it ANYWHERE

SCREEN \$4.79
40" WIDE BY 30"

TRIPODS \$2.49 each

CHAS. W. RICE & CO., INC. UNION CITY, IND.

RUPTURE

RELIEF...OR YOUR MONEY BACK

A simple... sturdy truss support built nature's way by old surgical appliance manufacturer. You risk nothing... relief or your money back. Send now for free booklet.

WEB TRUSS CO. Dept. S-7 Hagerstown, Md.

\$ MAKE MORE MONEY FILING SAWS \$

EARN \$6 AN HOUR WITH THIS MOTOR DRIVEN BURR SAW FILER

It does a better, faster and easier filing job. No time killing adjustments necessary... the accurate operator-controlled file arm will file from both sides. Gives a lifetime of service and has a 1 year guarantee. **FREE FOLDER ON REQUEST.**

Motor Driven Burr Saw Filer

WRITE FOR VALUABLE BOOK

Send 25c in coin for Burr's Blue Book of saw shop charges and other valuable information.

SAW SHOP CHARGES Coast to Coast

BURR MFG. CO., Dept. 7, 8943 Venice Blvd., Los Angeles 34, Calif.

Get into BUSINESS for Yourself!

METALIZING BABY SHOES AT HOME IN SPARE TIME



Get facts about amazing money-making Warner Success Plan that shows you every easy step in completely charted path to personal independence—with your home as your headquarters... This proved and tested Plan is working like magic. It's backed by an old, reliable company... And we send it to you on a No-Risk Trial Money Back Guarantee.

QUICK CASH WAITING

Demand for METALIZED Baby Shoes and other keepsakes is growing bigger daily. Our Tested Plan Shows How to Do the Work, How to Bring in the Business, How to Make as much as \$5 an Hour. Spare or full time, big steady profits are waiting for you. Send penny postcard or mail coupon for FREE Facts. Act! Time is precious.

FREE offer of **COMPLETE MONEY MAKING PLAN**

SEND NO MONEY Just Mail **COUPON**

Ray Brandell, Mgr., Warner Electric Co.,
1512 JARVIS AVE., DEPT. 2-M. CHICAGO 26, ILL.

Please rush complete details about your No-Risk Trial Money Back Plan for Metalizing Baby Shoes. Everything you send is **FREE** and costs me nothing—now or ever.

NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

For CRACKS in Concrete

Don't let cracks, widened seams, shallow holes in your concrete basement or garage floor cause you trouble! Fill them with Smooth-On No. 7B Quick Floor Patch Cement. Finish level with surrounding surface. The repair hardens in a few hours and is then ready for use. Ask for Smooth-On No. 7B Quick Floor Patch by name and number, in 1-, 5-, 20- or 100-lb. sizes. If your hardware store hasn't it, write us.



FREE 7B LEAFLET and SMOOTH-ON HANDBOOK

Leaflet shows how to use No. 7B. Handbook shows time-saving, money-saving home repairs you can make with other Smooth-On Cements—leaks stopped, cracks sealed, loose parts made tight. 40 pages, 170 pictures. Write us for both—**FREE**—today.

SMOOTH-ON MFG. CO., Dept. 58G,
570 Communipaw Ave., Jersey City 4, N. J.



Do it with **SMOOTH-ON**
QUICK FLOOR PATCH CEMENT

JULY 1950 51

REMEMBER IT'S DANGEROUS to pay less if you want safe, balanced matched tires. You see our adv. every month. Positively not recaps. We serve ambulances & schoolbuses.

These low prices mean you are saving up to **22%** | C.O.D.'s mean only expensive Bookkeeping makes GOOD tires cost more; cheap tires cheaper.

MONEY BACK IF ANY TIRE IS NOT AS ADVERTISED

Hundreds of thousands of folks in U. S. have sent their money in advance; assured by satisfied friends, that we will never break faith.

GOOD YEAR **Firestone**
Goodrich **U. S. ROYAL**

and others. Original GOOD Tread. Slightly worn. No Retread or Recap. Our policy is to select your tires so carefully as if our very future depended on the service given by that particular tire.

ONLY BLATT SENDS A FREE TUBE WITH EVERY TIRE
SENDS A 26 MONTH GUAR. BOND

Matched "4 star" Lo Price Value. 12 months guarantee Bond
600-16 \$3.65 | 650-16 \$3.85 | 700-16 \$5.40 | 650-15 \$3.85
700-15 3.95 | 750-16 5.95 | 550-17 5.75

*******TRUCK TIRES—12 Month Guarantee** | 650-20 \$7.75
32x6(8) \$8.45 | 750-20(10) \$9.25 | 1100-20 \$13.20 | 900-20 11.15
32x6(10) 10.25 | 825-20 11.10 | 700-20 8.95 | 1000-20 12.65

PREMIUM GRADE 26 Months Golden Rule Guarantee Bond
This grade made the Blatt name "world famous"

600-16 \$5.50 | 650-16 \$5.90 | 700-15 \$5.75 | 475-19 \$5.85
600-16(6) 6.45 | 700-17 9.00 | 650-15 5.70 | 525-18 5.81
700-16 6.80 | 750-16 7.75 | 550-17 6.50 | 550-16 5.50
670-15 5.75 | 710-15 6.50 | 760-15 6.50 | 820-15 6.20

TRUCKERS—Paying These Few & More, Means Extra Miles to You
TRUCK TIRE EXPERTS—Matched Tires 6-8-10-12-14-16 Ply
PREMIUM GRADE 26 Months Golden Rule Guarantee Bond

600-20 \$9.90 | 32x6(8) \$10.90 | 900-20 \$16.25 | 1000-22 \$15.25
650-20 9.90 | 32x6(10) 13.25 | 1000-20 16.30 | 1100-22 15.95
700-20 10.90 | 750-20(10) 13.25 | 1100-20 17.00 | 1100-24 17.00
750-20 10.90 | 825-20 16.25 | 750-15 9.95 | 700-17 10.00

MILITARY*** GUAR. 30 MOS. (Supers 14 Months)**
600-16 900-16 750-20
Super \$5.75 Super \$7.74 Super \$7.95
***** 6.75 ***** 9.95 ***** 11.00 45,000
Rugged 7.75 Rugged 11.25 Rugged 14.50 MILES

BLATT Girard & Lancaster Aves., Dept. PS
BLATT BUILDING PHILADELPHIA 31, PA.
Send ck. or money order and this ad for rush shipment. We won't ship a tire we wouldn't use ourselves. Instant shipment down South, Far West, and the world over. The name to trust in rubber.



SPEED & MILEAGE MANUAL

Easily Get Super Speed, Acceleration, Mileage—Top Racing Performance From Any Automobile!

Famous New Book shows simplified Soup-up Methods—Speed Tuning—Economy Secrets—Customizing Plans—Latest Track Proven Methods for all cars! Tells how to build your own **SPEED EQUIPMENT!** **FAST SPORT CARS!** "CALIFORNIA HOT RODS"! 200 H.P. ROAD & TRACK CONVERSIONS! Complete instructions on building inexpensive Superchargers! Dual Manifolds! "Water Injectors"! High Compression Heads! Twin Mufflers! Economizers! All about—Fast Engines, Gas Saving, Restyling, "Cam Secrets," Multiple Carburetion, Fuels, Porting, Ratios, Frames, "Offys"! **BRAND NEW METHODS, Plans, Formulas, "Racing Tricks"—"STOCK CAR SPEED SECRETS"!** Reveals 100 ways to save gas! Shows latest "HOLLYWOOD CUSTOM STYLING"! Streamlining! Sport Changes! Lowering! Speed Conversions! Including—California Roadster Plans! Racer Diagrams! Working Drawings! Performance Charts! Graphs! Beautiful Photographs! Etc.!

Large manual (plus) "California Equipment Catalog" and Hot Rod Handbook.

ALMQUIST AUTOMOTIVE ENGINEERING
Milford 12Z, Pa.

ALL \$198
THREE—1 P.Pd

FOAM RUBBER

FOR HOBBYISTS, CRAFTSMEN, EXPERIMENTERS



Lowest Prices—SAVE 50%
16 x 16 x 1 1/2" ea. \$1.25
16 x 22 x 1 1/2" ea. 1.55
18 x 24 x 2" ea. 2.00
24 x 24 x 2" ea. 2.75

AUTO SEAT TOPPER PADS
Place on seat cushion and cover with your seat cover.
24" x 60" x 1 1/2" ea. \$5.00
24" x 60" x 2" ea. 7.50

Use for furniture cushion fillers, mattresses, Mattress pads, cushions. Foam Rubber is available in any size or thickness. Send For Free Price List. Immediate delivery. No C.O.D.'s. Add 10% for Postage & Handling to Above Prices.

RIOR RUBBER COMPANY, Dept. S-8
50 East 22nd St. Chicago 16, Ill.

SHOE REPAIR OFFERS BIG INCOME

LEARN IN 12 WEEKS TIME

You can own your own shop or earn big income as skilled shoe repairman. Growing demand everywhere at top wages for men who know how. We teach you quickly by actually working on shoes and modern machines. School open to all from 18 to 60 years of age. **Free Big 20 Page Book** explains everything. Send for your copy today. Established 1927.

MODERN SHOE REBUILDING SCHOOL
Chicago and Los Angeles only. Approved for Vets. Dept. PS-70
2937 Belmont Ave., Chicago, Ill. 361 12th St., Oakland, Calif.
806 So. Figueroa St., Los Angeles 14, Calif.



LEARN MEAT CUTTING

At Home—In Spare Time

Get into the vital meat industry. Concise, practical Home Training based on 25 years proven instruction methods used at National's famous resident school. Prepares you for bigger pay as Meat Cutter, supervision, market manager or more money in your own store. Go as rapidly as your spare time permits. Diploma. Start NOW to turn your spare hours into money. Send for FREE bulletin today. No obligation.

National School of Meat Cutting Inc., Div. O-92, Toledo 4, Ohio

Build your own JET ENGINE!



SEND NO MONEY

Order these plans today

1. JET PROPELLED BICYCLE. Assemble your own. Photo and instructions \$1.00.
2. HOW TO MAKE EXPERIMENTAL JET ENGINES. Seven sheets drawings with information and instructions \$2.95.
3. BOTH OF ABOVE in one order \$3.75. SEND NO MONEY. Order both at once \$3.75 C.O.D. in USA plus c.o.d. postage. Send check or Money Order and we pay postage. Get other information too. Rush Order.

J. HOUSTON MAUPIN, Dept. 66, Tipp City, Ohio

make your own Gems 29.50 F.O.B.

All necessary lapidary equipment is furnished, including a super-charged diamond blade for sawing, and all wheels for grinding, shaping and polishing; also complete instructions. The complete equipment as shown, less motor and belt, for only \$29.50, f.o.b., Burlington, Wisconsin. Write today for information and literature.

B&I MANUFACTURING CO.
Dept. M Burlington, Wis.



Please Mention Popular Science when writing

WAR BARGAINS
SURPLUS Over 200 terrific ALSO FACTORY SURPLUS VALUES!
FREE SEND FOR catalog
SIoux FALLS SURPLUS STORE
SIoux FALLS, S.DAK.

BECOME A JET ENGINE EXPERT

BE READY
Start NOW

Aviation's NEWEST OPPORTUNITY — Study with LIVE JETS at CAL-AERO only — AERONAUTICAL ENGINEERING & MASTER AVIATION MECHANIC training since 1929 — Approved for VETERANS. WRITE TODAY for Special Information.

PS-7

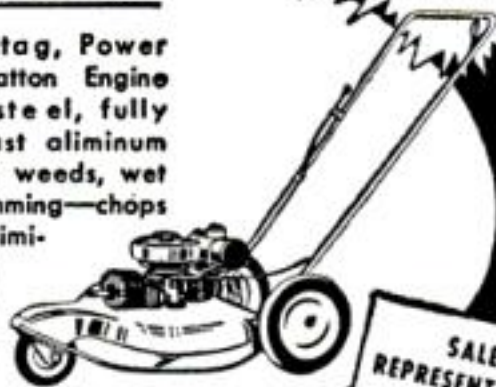
NAME _____ AGE _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

CAL-AERO TECHNICAL INSTITUTE
GRAND CENTRAL AIR TERMINAL • GLENDALE 1, CALIFORNIA

POWER MOWERS

Powerful—Streamlined

Complete with Maytag, Power Products or Briggs-Stratton Engine—18" rotary tool-steel, fully guarded blades—cast aluminum body. Cuts grass and weeds, wet or dry—does all trimming—chops grass into fine mulch, eliminating raking. Send check with order, or specify C.O.D. Write for free information.



SALES REPRESENTATIVES WANTED

HARTMAN Corp.

1111 So. Kirkwood Rd., St. Louis 22, Mo.

ATTENTION LEATHERCRAFTERS

LOOK WEST, to the home of Leather Carving and Stamping. More than 100 LEATHERCRAFT KITS in finest Tooling and Carving Leathers. Best assortment of tools and accessories in U.S.A. Other handcraft materials also. Send 10c for 96-page illustrated catalog.

GRIFFIN CRAFT SUPPLIES (since 1924)

5626-B Telegraph Avenue

Oakland 9, California

TAKE 3-DIMENSIONAL PICTURES WITH YOUR OWN 35MM CAMERA

NOW ONLY (Outfit No. 101, was \$22.50 plus tax)

STEREO-TACH **\$17.70**

Plus \$2.09 Fed. Tax

and 3-D Slide Viewer complete. Make marvelous stereo color or b & w slides. Get Stereo-Tach from your dealer or direct. Money back guarantee.



Dept. PS7 ADVERTISING DISPLAYS, INC. Covington, Ky.

EARN A \$10,000 REWARD!

Famous Super Sniffer for URANIUM PROSPECTING



Compact 2 lb. Geiger counter. Uses only 2 flashlight batteries. Highly sensitive to both betas and gammas. Signals with flashing light and headphone clicks. Guaranteed, foolproof circuit. Complete with radium source, headphones, batteries, book "Prospecting for Uranium." **\$54.50** post paid. (no c.o.d.)

DEALERS INVITED

NUCLEAR CORP., 253 W. Erie St., Chicago 10

WHEELS—WHEELS

5" Disc Wheel 5/8" Tire 5/16" or 3/8" sleeve	30c ea.
6" Disc Wheel 5/8" Tire 5/16" or 3/8" sleeve	35c ea.
7" Disc Wheel 3/4" Tire 3/8" sleeve	45c ea.
8" Disc Wheel 1 1/8" Tire 1/2" sleeve	70c ea.
7" Disc Wheel 1" Tire 1 1/4" ball bearing	80c ea.
8" Disc Wheel 1 1/8" Tire 1 1/2" ball bearing	\$1.00 ea.
8" Disc Wheel 2" semi-pneum. T. 1 1/2" B.B.	\$1.35 ea.
10" Disc Wheel 1.75 semi-pneum. T. 1 1/2" B.B.	\$1.50 ea.
12" Disc Wheel 1.75 semi-pneum. T. 1 1/2" B.B.	\$1.85 ea.

Above wheel prices include hub cap. Plus Postage. 20% — C.O.D.'s accepted.

UNITED WHEEL STAMPING CO., PS-7

2756 W. 115th STREET

CHICAGO 43, ILLINOIS

Free for Asthma

If you suffer with attacks of Asthma and choke and gasp for breath, if restful sleep is difficult because of the struggle to breathe, don't fail to send at once to the Frontier Asthma Company for a FREE trial of the FRONTIER ASTHMA MEDICINE, a preparation for temporary symptomatic relief of paroxysms of Bronchial Asthma. No matter where you live or whether you have faith in any medicine under the sun, send today for this free trial. It will cost you nothing.

FRONTIER ASTHMA CO.
462 NIAGARA ST.

630-D FRONTIER BLDG.
BUFFALO 1, N. Y.

WANT TO SAVE GAS? FREE TRIAL IN YOUR CAR

Replaces idle adjustment screw in your carburetor

THE AMAZING NEW GANE Air Flow NEEDLE



Holes for Air Flow

ABOUT 1/2 MILLION

IN USE

Up to 25% MORE MILEAGE, EASIER STARTING, FASTER PICK-UP, and SMOOTHER IDLING—many users report with this SENSATIONAL NEW automotive product. Now, test it in your car AT OUR EXPENSE. Then, after 10 days, check mileage and engine performance. If satisfied, send only \$1.50 per needle (8 cyl. cars take 2). If not entirely satisfied, just return them—FAIR ENOUGH? Some users report no improvement so TRY BEFORE YOU BUY. Send name, address, year and make of car, and name of carburetor.

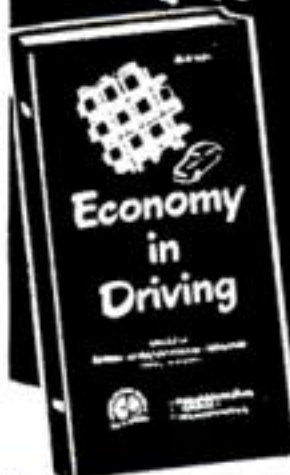
SENT FREE

when you accept this Gane Needle Free Trial offer. Tells how to save gasoline, oil, tires, brakes...get more power, speed & better engine performance.

MAIL CARD TODAY

& also receive FREE book to keep, even if you decide not to purchase GANE NEEDLE.

SEND NO MONEY PAY POSTMAN NOTHING



National Automotive Research Corp.
Dept. H-7 Venice, California

New Advertising Machine



Prints & Illustrates 1¢ Post Cards

FREE Learn how thousands of business men, in every line, are boosting sales in spite of conditions—with 1¢ messages—printed and illustrated in a few minutes on gov't post cards—with amazing new patented **CARDMASTER**. Your "today's" ideas, read by your prospects next morning. Not a toy, but a sturdy advertising machine, built to last for years. Low price, sold direct. Guaranteed for five years. Send name today.

SEND NAME We'll send FREE illustrated book of money-making IDEAS for your business and complete, unique advertising plans. RUSH YOUR NAME TODAY.
CARDMASTER COMPANY
1920 SUNNYSIDE, Dept. 167, CHICAGO 40, ILL.

DELIVERED TO YOUR DOOR POSTAGE PREPAID!

Everything Sold with Unconditional Money Back Guarantee

NEW! 1½ QUART "C.T.C."



FIRE EXTINGUISHERS

All BRASS case and Handle painted gray. "Fyr-Fiter" and "General Detroit." Complete with wall brackets. For Home, Garage, Truck, Car, etc.

We Pay All Postage.

COST \$18.50
NEW \$3.39

"SIMPLEX" RAZOR WITH 5 BLADES



In Plastic Traveling Case. 5 blades alone are worth 19c.

50c Value

10c

NEW! U. S. Army—Arctic Mountain Type Feather Sleeping Bags

Made to the highest army specifications in every detail. • Highly water repellent, extremely durable poplin outer cover • Feather filled for most comfort and warmth • Full front zipper, leaving only face exposed. Grand for every camping need.

\$29.95 Value
\$14.75



NEW! ALL WOOL SLEEPING BAGS
\$12.50 Val.
\$5.39

We Pay All Postage

SEND FOR FREE CATALOG — AMAZING VALUES!

UNIVERSAL ENTERPRISES

DEPT. 5-O 946 S. MAIN ST.

LOS ANGELES 15, CALIF.

WE PAY POSTAGE, TAXES, INSURANCE ON ALL ARTICLES.

Gun Cigarette Lighter



TRIGGER ACTION LOOKS REAL

Regular 750 Value
Only **\$2.98**

- Perfect Size for Pocket or Purse (3½" x 2½")
- Looks Exactly Like Real Gun
- Works Perfectly Every Time
- Highly-polished Chrome Finish
- 100% Satisfaction Guaranteed

Amazing new automatic cigarette lighter... looks exactly like real gun. When your friends see it, they will gasp... pull the trigger and you have a sure light every time. Precision made with black composition handle. Handsomely boxed for gift-giving. Order yours today! Send \$2.98 and we will pay postage. C.O.D., you pay postage plus C.O.D. charges. Either way, if not completely satisfied, return within 10 days for complete refund.

MODERN MERCHANDISE
412 S. Market St. Chicago 7, Ill.

ACCURATE WRIST WATCH GUARANTEED

You Too, will be proud to wear this wrist watch imported from Switzerland. Made by skilled artists that insure a perfect timepiece. Chromium plated with a stainless steel back that resists moisture and shocks. Big SWEEP SECOND HAND. LUMINOUS dial that can be seen in the dark. **\$4.98**

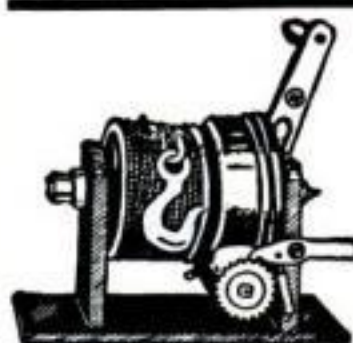
FREE: At no extra cost we will include a Brand New STAINLESS STEEL STRETCH WATCH BAND and a 1 year guarantee against mechanical defects. Send \$5. We Pay Postage.

CHARM SALES CO., 125 E. 46 St., Dept. C-89, New York 17, N. Y.



GOVERNMENT SURPLUS HOIST and WINCH

Reconditioned and Completely Overhauled—Like New



Originally made to be used on B-29s for lifting bombs mounted on sturdy steel base, can be attached to truck body or any solid base. Ideal for lifting or moving loads onto trailer, trucks or tractors or for home work shops, machine shops, garages, warehouses or farms. Capacity 2,000 lbs. Equipped with ratchet for holding load and 18 ft. 3/16 steel cable, shipping weight 50 lbs. F.O.B. Buffalo, N. Y. Send check or M.O. for immediate delivery. No C.O.D.'s. As described above. **\$34.95**

This Hoist Can Be Supplied with "Free Wheeling" Drum For \$44.95. When Ordering Specify Type.

PRECISION AVIATION PRODUCTS, INC.
205 Clinton Street Buffalo 4, New York

New For 1950
MIDWEST RADIO and TELEVISION

30 DAYS TRIAL FACTORY-TO-YOU

COMPLETE CHASSIS and CONSOLES



MIDWEST RADIO & TELEVISION CORP.
Dept. X24C, 909 Broadway, Cincinnati 2, Ohio

Send for **FREE** 32-Page 4 Color CATALOG

NAME _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

ROTO-TRIM



THE GREATEST HEDGE TRIMMER VALUE ON THE MARKET

- ★ RIGID CONSTRUCTION OF STEEL AND ALUMINUM
- ★ HANDLE TURNS CUTTING BLADE TO ANY ANGLE
- ★ EFFICIENT—GUARANTEED—FITS ANY ¼" DRILL

Smooth running hardened steel gears and cam plus scientifically designed blades of high carbon steel, heat treated and precision ground make the Roto-Trim the easiest to handle, keenest cutting hedge trimmer on the market, regardless of price.

TRIMS GRASS, too. Helps keep the whole yard neatly tailored. A great addition to the drill attachment line. It's much easier for women to handle than the more expensive trimmers. Works with any drill of 1500 r.p.m. or over.

10.95
(less drill)

ROTEX CO. DALLAS 8, TEXAS



NEW! Trash Disposal Unit Burns Refuse Safely

● A new type outdoor dispose-all unit safely and quickly burns garbage and trash in any weather. All refuse, damp, green or dry is fully consumed. Scientific draft design completely eliminates fire hazard of flying ash, sparks, burning, blowing bits of paper. Intense combustion removes neighbor-annoying nuisance of flying scraps, smoke, smell.

Sturdily built to last for years. Nothing to get out of order. Needs no watching. Will not blow over. Will not destroy grass or shrubs. Ends refuse hauling and fire hazards to quickly pay for itself. Measures 23" square at base by 40" high. Weighs 23 lbs. Over 2 bu. capacity. Recommended by Bureau of Fire Prevention. Full price \$9.95—nothing else to buy. Sent F.O.B. Cleveland. Money back guarantee. Send check, cash, or money order to:

ALSTO COMPANY, Engineers Bldg., Dept. PS-7, Cleveland 1, Ohio

WHY DON'T YOU WRITE?

Writing short stories, articles on business, travel, shop crafts, sports, local and club activities, etc., will enable you to earn extra money. In your own home, on your own time, the New York Copy Desk Method teaches you how to write the way newspaper men learn—by writing. Our unique "Writing Aptitude Test" tells whether you possess the fundamental qualities essential to successful writing. You'll enjoy this test. Write for it, without cost or obligation. **Veterans: This course approved for Veterans' Training.**

NEWSPAPER INSTITUTE OF AMERICA
SUITE 5720-L, ONE PARK AVENUE, NEW YORK 16, N. Y.



BE A LOCKSMITH

Learn Locksmithing and Keymaking from Experts in Your Spare Time at Home! Locksmiths in big demand! No layoffs, no slow seasons! Age or physical handicap no disadvantage. Year-round, steady income in this permanent, respected field. Full or part time. Practical, illustrated lessons show you how to make money even while learning! All materials and special tools supplied. Send for FREE BOOKLET.

LOCKSMITHING INSTITUTE, Dept. PS-7
55 Park Ave. Rutherford, N. J.

Be a DETECTIVE

A CHALLENGE FROM WASHINGTON, D. C. Help Stop Crime! Train at home. Earn big money. Amazing training course from the NATION'S CAPITOL (center of law enforcement) by former U. S. GOVT. AGENT and NAVAL INTELLIGENCE Officer exposes actual methods used by Criminals. Write for FREE BOOK. State age.

INTERNATIONAL DETECTIVE TRAINING SCHOOL
1701 Monroe St., N.E. Dept. 217 Washington 18, D. C.



BURIED TREASURE, MINERALS AMAZING NEW GOLDAK LOCATORS

SENSATIONAL NEW MODEL!
ONLY 11 pounds weight! One hand operation! Money-Back Guarantee of Superiority. Write for full details.

THE GOLDAK CO.
1544 WEST GLENOAKS BLVD.
GLENDALE 1, CALIFORNIA

World's
largest
maker
of fine
locators.



Say You Saw It In Popular Science

SHEET METAL BRAKES

Forms angles, flanges, and Pittsburgh locks. Bends 26 gauge steel. Heavier copper and aluminum. Cam locking. Portable, can be clamped to edge of truck. All steel, reinforced. Wt. 42 lbs. Express collect. 30".....\$26.50
36" Size. Wt. 52 lbs.\$31.00

12" BRAKE. Fits in vise to form difficult compound bends, up to 20 gage steel.....\$12.50 P.P.

18" CURVE FORMER. Capacity—16 gage steel \$10.00
SHEET METAL PLIERS. 2 1/2" wide, \$2.00; 5", \$3.00.

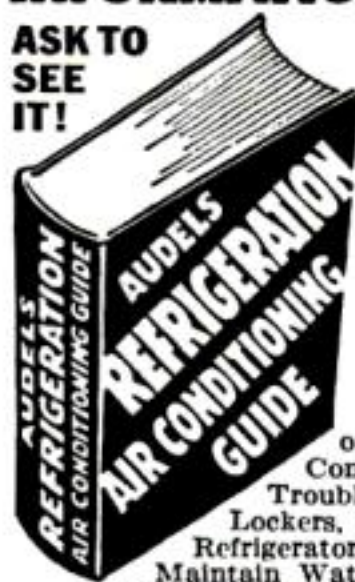
Immediate delivery. Order direct, cash or C.O.D., or send for folder.
VISE BRAKE MFG. CO., S-1116 So. 27th St., Omaha 5, Nebr.



30 AND 36 IN.

REFRIGERATION AIR CONDITIONING INFORMATION IN A HANDY FORM

ASK TO
SEE
IT!



Every Serviceman, Mechanic & Operator can use AUDEL'S REFRIGERATION & AIR CONDITIONING GUIDE, containing Practical, Inside Trade Information on the whole subject of Refrigeration & Air Conditioning. Tells How to Service, Operate & Repair Modern Household, Commercial & Industrial Units & Air Conditioning Systems. 1280 Pages, 46 Chapters Fully Illustrated & Indexed for Quick Reference.

1001 FACTS

This big, highly indorsed book, easy to understand, gives useful basic principles on How to Repair & Install Compressors, Control Devices. How to locate Electric Motor Troubles. How to Service & Adjust Cold Storage Lockers, Quick Freezing Units, Dairy & Market Refrigerators, Ice Cream & Soda Fountains, How to Maintain Water Coolers, Marine Refrigeration, Plant Auxiliaries, Ice Making, Ammonia Plants, Brine Systems, Servicing Air Conditioning Systems, Replacement of Refrigerants including Freons, Heat Transmission & Pressure Temperature Charts, Tables, Duct Systems, Safety Codes, etc.

\$4 ANSWERS YOUR QUESTIONS

Get this Information for Yourself. Mail Coupon today.
COMPLETE • PAY ONLY \$1. A MONTH

AUDEL, Publishers, 49 W. 23rd St., New York 10, N.Y.
MAIL AUDEL'S REFRIGERATION GUIDE for free examination. If O. K. I will send you \$1 in 7 days; then remit \$1 monthly until price of \$4 is paid. Otherwise I will return it.

Name _____
Address _____
Occupation _____
Employed by _____ P.S.M.

"TOOK IN \$217 FIRST 10 DAYS"

Some Make More,
Some Less...

**We Help You
to Start Your Own
All-Year Business,
Make Big Money!**

With our easily operated, highly efficient wall washer, Chas. Stelle took in \$217 gross in first ten days. E. L. Goss took in more than \$10,000 in one year. E. C. Taber wrote, "I made \$400 gross in two weeks." And no wonder—this machine washes walls 6 times faster and better than by hand.



YOUR MONEY-MAKING OPPORTUNITY

We want more men to go into this profitable business for themselves and enjoy independence. There are customers everywhere—homes, offices, schools, churches, hotels, stores, etc. What you take in is mostly profit, for material costs are low. And there's no need to rent a shop or office. Operate your business from your home.

Lose no time. Get all facts without obligation. WRITE FOR FREE INFORMATION. Ask for Wall Washer Details at once.

VON SCHRADER MFG. CO., 767 PL., Racine, Wis.

NOW! YOU CAN BUILD YOUR CHOICE OF 78 RADIO AND TELEVISION SETS Easily and At Low Cost!

IT'S AMAZINGLY EASY TO BUILD YOUR OWN SET!

Beginner or expert—now you can assemble a 30-tube TV set . . . convert your old radio to a portable . . . build a short-wave set . . . rig up a home intercom system . . . build an all-speed record player . . . add an automatic tuner to your set . . . make a matchbox radio . . . service your own video outfit . . . and do scores of other fascinating, money-saving jobs! It's *easy as pie* with this new, 256-page, lavishly illustrated, 6-color book!

SIMPLE AS A B C!

Directions are so simple and down-to-earth that you can't go wrong! Prepared by POPULAR SCIENCE Editors for men who like to tinker and want the thrill of BUILDING . . . REPAIRING . . . REMODELING virtually every type of Radio, Television Set or Record Player! Over 900 diagrams, charts and drawings show you EXACTLY how each step is done!

FULL WEEK'S FREE TRIAL!

Send No Money Now!

As a Popular Science reader, you're entitled to a 7-day FREE Trial while this bargain edition lasts! Clip and mail attached coupon today. When your book arrives, simply pay postman \$1.98 plus a few cents postage as payment in full! At the end of an entire week, if you're satisfied that it's the best Radio and Television Manual you've ever seen, keep it at no further charge! If not, return it for full refund!

MAIL COUPON TODAY

Popular Science, Dept. 750
353 Fourth Ave., New York 10, N. Y.

Send me the book(s) checked below:

HOW TO BUILD 78 RADIO AND TELEVISION SETS

☐ Regular Cloth Bound Edition: \$1.98

☐ De Luxe Edition bound in extra-heavy cloth, stamped in gleaming gold, with stained page edges: only 50c additional—\$2.48

☐ EVERYBODY'S RADIO MANUAL: \$1.49

☐ RADIO FOR THE MILLIONS, De Luxe Edition: \$1.98

I will pay postman price plus postal fees. If not completely satisfied, I may return book(s) within 7 days for full refund of purchase price.

Name.....

Address.....

City.....Zone.....State.....

☐ Check here if you send payment with order, and we will pay all shipping costs. Same return privilege.



This great 6-color book, packed with 78 complete plans, 672 pictures, 256 big pages, 212 wiring diagrams, scores of charts and a full index is at least a \$3.98 value! But because we printed it on our own presses—YOU PAY ONLY \$1.98! That's just a small fraction of the money you'll save the very first time you use HOW to BUILD 78 RADIO AND TELEVISION SETS. Order now while limited edition lasts.

Order now while limited edition lasts.



Two of the 78 sets you can choose!

OTHER RADIO BOOK BARGAINS!

EVERYBODY'S RADIO MANUAL
Shows you how to "trouble-shoot" like an expert. 256 pages, 216 pictures, 75 wiring diagrams. Big, cloth-bound book: \$1.49.

RADIO FOR THE MILLIONS
78 complete plans for building every type of radio imaginable! 648 pictures, 192 giant pages, Special De Luxe Binding: \$1.98.

Order these great radio books on attached coupon!

WANT MORE MONEY? Make Fast HUGE PROFITS AT HOME - SPARE OR FULL TIME

Materials
COSTS YOU 5¢ -
YOU GET \$5.00



Now is the time to cash in on this big-paying easy-to-operate year 'round business for yourself and you need no experience! 4 MILLION new babies every year, with parents eagerly waiting for you to metallize baby shoes in real GOLD, SILVER, BRONZE, PEARL and GLASS. Everything furnished so that YOU can start earning money at once - up to \$1,000 per month full time... \$50 to \$75 per week spare time - at \$5.00 per hour. They will last forever... huge new market every year waiting to buy! Start as small or as large as you wish, and watch it grow to a real BIG-MONEY operation. FREE DETAILS - send no money - a postcard with your name will bring all the facts. Don't pass up the golden opportunity to start your own business on a shoestring - so ACT NOW. Write at once to

KIKTAVI COMPANY Dept. PS-7,
2111 West Manchester, Los Angeles 47, Calif.



FREE! 3 way profit plan yours to inspect at your risk for 7 days. Includes two actual metallized baby shoes - or a pair of your own metallized at no extra cost.

- Big Income
- Huge Demand
- Future Security
- Your Own Boss
- Money Back Guarantee
- Most Successful Name in Metallizing

NEW THRILL

Gets Bass, Wall-Eye, Muskies



Pat. Appl. for

\$2.00 Postpaid

Here is PERMA-LURE, the newest plug-casting thrill, a genuine natural minnow encased permanently in solid crystal clear plastic. Use it year after year! Incredibly lifelike! Terrific attraction for record-breaking Bass, Wall-Eye, Muskies! Daily limits! Ideal gift. ORDER NOW \$2.00 each postpaid in U. S. or C.O.D. plus charges. You will be pleased or your money back. Dealers, write.

SPEEDSITE SALES, Dept. O, P. O. Box 83, Grand Rapids, Mich.

PLUG CASTERS!

USE REAL MINNOW PRESERVED FOREVER IN CLEAR PLASTIC!



METRO-SCOPE WITH AUTOMATIC FRICTION BRAKE

Top Value at \$1.65

INSTANT RELEASE BUTTON

NEWEST METRO-SCOPE has exclusive brake, insures accuracy by "locking" blade in exact position, leaving hands free. Direct inside measurement, full 72", durable, attractive. At your hardware store, or send us \$1.65 today with dealer's name. (Guaranteed.)

DART MFG. COMPANY, MASON 1, MICHIGAN

MONEY for MEN ALL DATA FREE

THE PLASTEX Industry needs manufacturers on small scale and for big production of Lamp and Clock Stands, Art Goods and Novelties in Plastex and Marble imitation. Experience unnecessary. 1/2c material makes regular 10c store sellers. Rubber moulds furnished for speed production. Small investment brings good returns. Big chain store orders now being placed. Ambitious men have chance for real prosperity. Our Free booklet will interest and benefit you.

PLASTEX INDUSTRIES, Dept. 2, 3400 Third Ave., New York 56, N. Y.

WHAM-O SPORTSMAN

\$1.00 POSTPAID

HITS LIKE A .22 RIFLE - KILLS RABBITS, SQUIRRELS. Powerful, silent, accurate. For hunting, target, routing pests.

"Dealers Write"

HUNTING SLINGSHOT

Heavy ash hardwood stock. 40 steel balls, extra rubber straps. GUARANTEED. Send \$1.00 today to Wham-O Mfg. Co., Box 85, South Pasadena, Calif. * The professional model of Nat'l Slingshot Assn.

Only \$2.45 Postage Paid



GIVES YOUR CAR "Rocket" Performance! MORE POWER • SAVES GAS • NO PING • REDUCES CARBON

JET VACUUM VAPOR INJECTOR MATIC

Install It Yourself On Any Car In 30 Minutes

MESCO PRODUCTS, 1430 Union Commerce Bldg., Cleveland 14, Ohio

AIR CONDITION Any CAR

PLANS SHOW YOU HOW... \$1.00 HOT OUTSIDE... COLD INSIDE

Enjoy pleasure driving in cool comfort in scorching outside temperatures, with real mechanical refrigeration. (Not a dry ice or window unit.) Easily installed by anyone handy with tools. No experience necessary. Powered direct from your engine. Completely automatic. PATENT FEATURE controls temperature from idle to 100 mph. Build and install it yourself! Keeps your automobile comfortable. Tractor Cab cool. Truck cooled for hauling perishables. Send \$1 for your set of PLANS now. Do it today! \$1.00 refunded if not satisfied.

LEJAY MFG. CO., 523 LEJAY BLDG., MINNEAPOLIS 8, MINN.



SALESMEN!

**WRITE
THREE
WORDS
COLLECT
\$7⁶⁵**



SENSATIONAL NEW ADVERTISING SIGN

YES, MAKE \$7.65 on 10-second demonstration to merchants. Write on glass with amazing magic crayon and presto—a 5-color advertising message takes fire and glows like a brilliant neon sign! Three sales a day and \$22.95 profit is for "lazy" men. Workers can double to triple that amount. FREE SALES KIT. Don't wait. Rush your name and address on a penny postcard for full details and complete sales kit—ALL FREE.

**MAXILUME CO., 125 W. Hubbard
DEPT. L-97 CHICAGO 10, ILLINOIS**

Would YOU Like to Make \$1,000 A MONTH?

*That's what Stanley Hyman
is making selling the amazing new
PRESTO Fire Extinguisher!*



STANLEY HYMAN

OVER 11,000 people died in fires last year. An eager public has been waiting for a practical new kind of fire extinguisher. Now it's here! Tiny "Presto" is about the size of a flashlight. Does the job of bulky extinguishers that cost 4 times as much and are 8 times as heavy. Ends fires fast as 2 seconds. Fits in palm of hand. Never corrodes. *Guaranteed for 20 years!* Sells for only \$3.98!

You can make good money showing this new discovery to owners of homes, cars, boats, farms, etc. Stanley Hyman reports making over \$1000 a month. H. J. Kerr, \$20 a day. William Wydallis, \$15.20 an hour.



Science's
New Midget
Miracle
"PRESTO"

What's the secret of "Presto's" amazing power? It's a new wonder chemical developed during the war, found to be 1.5 to 6 times as effective as chemical contents of other extinguishers on an equal weight basis. Makes possible, for the first time, an extinguisher that is small, light, and amazingly effective.

Help supply the demand for this important new discovery. Write for FREE Sales Kit. No obligation; no capital required. But don't put it off. Every day you hesitate may cost you \$10, \$15, or even \$50 you could be making.

Send postcard or letter to: **MERLITE INDUSTRIES, Inc., Dept. 117, 201 East 16th Street, New York 3, N. Y.** (If you want a regular Presto to use as a demonstrator too, send \$2.50. Money back if you wish. FREE re-fills for your Demonstrator.)

Stucco Spraying Can Be Your Opportunity



You can build a profitable, lifetime business with Colorcrete. Large waiting market. Work is easy and interesting. Moderate investment; high return. Large waiting market. Full instructions and liberal co-operation.

Sprayed-On Beauty

Colorcrete is modern beauty treatment for masonry surfaces—exterior and interior. Fuses to concrete, stucco, etc. Applied by air pressure. Range of many smart colors. Proven by 20 years of use on all kinds of buildings.

Write or wire for
Opportunity
Book.

**COLORCRETE
INDUSTRIES, INC.
572 Ottawa Ave.,
Holland, Mich.**



Ring For Boy's GIVEN AWAY



"Kind you've always wanted"

Is massive and expensive looking—finished in heavy Gold plate. Set with lovely simulated sparkling Ruby. Made especially for us. GIVEN for selling 4 boxes of Rosebud Products at 25¢ per box, returning \$1.00. Order 4 boxes of Rosebud Salve or 4 bottles of famous Rosebud Perfume. Send NO Money—We trust you.

ROSEBUD PERFUME CO., Box 65, WOODSBORO, MARYLAND.

**EYE-
GLASSES
BY MAIL
16 Days Trial**



Write Today for Free Catalog. Send no Money
ADVANCE SPECTACLE COMPANY
537 South Dearborn Street, Dept. SP-7, Chicago, Illinois



MEN! send for this MONEY- MAKING OUTFIT

**MAKE \$15⁰⁰ IN A
UP TO DAY**

Do you want to make more money in full or spare time... as much as \$15.00 in a day? Then write for this BIG OUTFIT, sent you FREE, containing more than 150 fine quality fabrics, sensational values in made-to-measure suits and overcoats. Take orders from friends, neighbors, fellow-workers. No experience needed. You'll say it's the greatest way to make money you ever saw.

SAMPLE SUITS TO WEAR Pay No Money! Send No Money!

Our plan makes it easy for you to get your own personal suits and overcoats without paying 1¢, in addition to your big cash earnings. This offer is limited. Rush your name and address for big FREE OUTFIT—today!

**W. Z. GIBSON, INC., Dept. G-520
500 S. THROOP ST., CHICAGO 7, ILL.**

LAWNMOWER SHARPENER OPERATORS



Increase your output...
Year 'round business!

NEW BED KNIFE GRINDER sharpens all STRAIGHT EDGE TOOLS

Model 50 Ideal Bench Grinder
doubles your output of sharpening
jobs, speedily grinds straight
blade knives. Sharpens all
kinds of straight edge
tools and ice skates.
Write for FREE, fact-
filled folder.

THE FATE-ROOT-HEATH COMPANY
Dept. D-4, Plymouth, Ohio

WANTED AIRCRAFT MATERIAL

Flight and Engine Instruments, Accessories, Airframe
Spares, AN Hardware, Pratt & Whitney and Curtis
Wright Engine Parts, Aircraft Radio Equipment, Elec-
trical Equipment and all other Aircraft parts. Write
P.S. c/o RYAN Co., 136 William St., N. Y. 7, N. Y.

All-Purpose Automatic ELECTRIC TIMER!

Hook it up yourself to any
electrical unit such as radios,
lights, machines, etc. You
set the dial from 1 to 24
minutes. Current shuts off au-
tomatically at indicated time.
Enclose money order or specify C.O.D.

ONLY
\$1.00
postage
paid
C.O.D.



N & J ELECTRIC

701 Hemlock St., Grand Rapids 4, Mich.

MASTER MIND!



Learn Short-Cut Mathematics

Juggle figures, do baffling number tricks.
Make people gasp at your marvelous light-
ning-quick mind. Multiply 4 figures by 4 figures
without using old-fashioned multiplication! Big
cloth-bound volume; fully illustrated course. In-
cludes worked-out problems, answers, etc. Sensa-
tional bargain, only \$1.49, postpaid — or COD plus
postage. Satisfaction guaranteed or refund. Order
this amazing "Short-Cut Mathematics" today!

NELSON-HALL CO., 1139 S. Wabash Ave. **\$1.49**
Dept. 36-1 Chicago 5, Ill. Complete

FREE—Amazing Book on RHEUMATISM, ARTHRITIS

If you suffer the aches, pains and discomforts of Rheumatism,
as manifested in ARTHRITIS, NEURITIS, SCIATICA or
LUMBAGO, send today for the FREE Book. It reveals im-
portant facts about why drugs and medicine give only tem-
porary relief without removing causes. Explains fully a proven,
specialized system of treatment that may save you years of
distress. No obligation. Write for this FREE Book today!

BALL CLINIC, Dept. 36, Excelsior Springs, Mo.

BUY U. S. SAVINGS BONDS

MEN A Blue Print For YOUR SUCCESS!

Here is your opportunity for Success. An amaz-
ing new finishing system that will start you in
your own profitable business. No experience neces-
sary—up to \$10 an hour easy. Spare or full time in
your own home or garage. Start small—grow big
fast. We will guide you every step of the way. This
is BIG—don't miss your chance. Send name now for
FREE SAMPLE of my complete easy profit plan
for your success.

COAST INDUSTRIES

Dept. 17 1004 S. Los Angeles St., Los Angeles 15, Calif.



**FREE
BOOKLET
& SAMPLE**

Yes, More Brilliant Than a Diamond!



Amazing New Discovery

Write today for the full
story of the latest miracle of
science, discovered in the labora-
tories of one of the world's largest
corporations. The story of the beau-
tiful Kenya Gem that so closely re-
sembles a diamond that only an expert
can tell the difference.

More Fire! More Brilliance!

Yes, this marvelous gem has more
brilliance, more fire, and a more daz-
zling display of color than the finest dia-
mond of equal size. And yet you can now own an unmounted
Kenya Gem for only \$24 (1 carat) to \$96 (4 carats);
also men's or ladies' beautiful gold rings for as little
as \$45. If you wish, you can buy on EASY PAYMENT TERMS.

The Cinderella of Modern Science

Kenya Gems are the sensational discovery you read
about in Sat. Eve. Post, Jewelers' magazine and N. Y. Times,
"the only thing on earth more brilliant than a diamond."
It is a true gem, crystallized by science instead of nature and
perfectly cut by expert cutters.

Send Coupon or Write today for
FREE illustrated literature.

KENYA GEM CORPORATION DEPT. 307

Copyright 1950
Kenya Gem Corp.

Philadelphia 44, Pa.

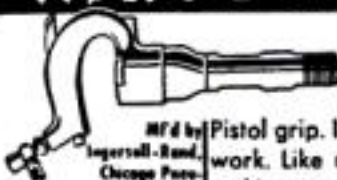
Mail This FREE COUPON Today!

Kenya Gem Corporation Dept. 307 Philadelphia 44, Pa.

Please send me, without obligation, the FREE illustrated
descriptive literature telling all about Kenya Gems, the new
discovery more brilliant than a diamond.

Name.....
Address.....
City.....State.....

WAR SURPLUS AND OTHER BARGAINS



PNEUMATIC RIVETER & CHIPPING HAMMER

Mfg. by Pistol grip. Ideal for fender, brake lining, concrete breaking
work. Like new. Six rivet sets and bucking bar included,
making a complete combination. Wgt. 9 lbs. Each **\$6.95**

INSIDE MICROMETER 2" to 8"

Precision made of tool steel. Hardened tips
on all six measuring rods. One 1/2" spacer.
Chrome finish. Complete with case. **\$6.95**



MICROMETERS



Chrome plated, precision engineered and carefully tooled to
give long life. All new. 0-1" capacity . . . ea. **\$2.25.**
1-2" cap. **\$3.50.** 2-3" cap. **\$5.50.** 3-4" cap. **\$6.50.**

HYDRAULIC HAND PUMP

2000 P.S.I.
For oper-
ating hydrau-
lic jacks, presses,
hoists, cylinders, etc. Built-in check
valve. Alloy aluminum housing. 2 1/4"
x 3 1/2" x 8". Ship. wt 3 1/2 lbs Value,
approx. \$45. Complete with handle.
ALL NEW **\$6.95**

HIGH SPEED DRILLS

All New Fractional
& numbered Orig.
Val. \$15. Nationally
known brand. Astd.
sizes. Set 30, **\$3.50**

EXTENSION DRILLS

High Speed Steel, like new.
Astd'd sizes from No. 1/4 to 40.
Lengths from 6" to 12" Ap-
proximately \$20 value.
Set of 12 **\$3.75**

Send check, money order or cash 25% deposit required on C.O.D. orders.
All prices F.O.B. Culver City, Calif. Send 25c for Illustrated Catalog.

AIRBORNE SALES CO., INC. DEPT. PSM 7-0
CULVER CITY, CALIF.

Classified Ads only 80c per word per insertion, payable in advance. Minimum ad 10 words. To be included in September issue, copy should be in our office by July 26th.

CLASSIFIED OPPORTUNITIES

POPULAR SCIENCE MONTHLY-351 FOURTH AVE.-NEW YORK CITY 10

1 AUTOMOBILES

RACING equipment from California—Speed-Dress-up Accessories for every make passenger automobile—Racing Ignitions, Carburetors, Flywheels, Camshafts, Water Injectors, Mufflers, Crash Helmets—Thousands of items in stock. Dual Manifolds for Willys Jeeps to Oldsmobile Rockets—Finned High Compression Heads—covering 150 different makes and models. New 1950 Illustrated Speed Catalogues—25c. (Dealers, request Wholesale Catalogue). Newhouse Automotive Industries, 5805-A 7, East Beverly, Los Angeles 22.

FREE Trial—10 days. Latest Chevrolet Speed-Power Manual! Ninety pages of accurate information on how to increase speed and power of any 1937 thru 1950 Chevrolet. Learn how to install late engines in pre-1937 chassis. Full data on cams, high compression, multiple carburetion, supercharging, ignition, etc. Proves that your Chevrolet can have superior power and speed. If you don't agree this is the finest Chevrolet manual you've ever seen—just send it back within 10 days. If satisfied, send \$2.00 to California Bill, Box A-7, Eagle Rock, Los Angeles.

ENJOY New-Car pep and power in your old Buick. Same day service from world's largest stock of new (not rebuilt) Buick parts and engines. Ship anywhere. Dime brings catalog. Write today. Robertson Buick Co., 1002 S. Wabash Ave., Chicago 5, Illinois.

SILENCE Overhead-valves, attachments unnecessary. \$2.00. Derderian, Box 542, Sandston, Virginia.

"WATER Injection" Also—Speed—Power Economy—Methods! Free descriptive, illustrated, information. Neher Industries, La Verne 6, California.

SEE our ad under Motorcycles for Midget car bargains. Midget Motors Directory, Athens, Ohio.

"If You Want To Go Let Us Know" Complete Line of Sport's Car, Stock Car, Road Car Equipment. Illustrated Catalog 15c. Dealer's Wanted. Hi-Speed Power Equipment, 228-20 Merrick Road, Laurelton L. I., N. Y. La-5-9535.

CALIFORNIA Custom accessory headquarters. Buy direct from original designers and save. Chrome dash panels, solid hood rides, grille panels, speed equipment, dual pipes, push button door conversions, chrome motor accessories, fender skirts. 34 page illustrated catalog 25c. Eastern Auto, 3319D, South Grand, Los Angeles 7, Calif.

S-P-E-E-D & Mileage Manual—"New Jumbo edition"! 200 Illustrations, Drawings, Charts, Photographs! "Guaranteed finest, most Authoritative book"! Easy, inexpensive ways to build Speed Equipment—California Hot Rods—Beautiful Custom Cars—200 H.P. Road, Track Conversions—Superchargers—Dual Manifolds—Racing Heads—Twin Mufflers—Water Injectors—Economizers! "Get super speed, mileage, acceleration—top racing performance from any car"! Complete instructions with working diagrams on Fast Engines, Speed Tuning, Restyling, "Customizing," Gas Saving, "Racing Tricks," Cams, Fuels, Balancing, Porting, Ratios, Frames, "Offys"—"Learn 100 ways to save gas"! Reveals "Stock Car Speed Secrets"! California Speed Shop Methods! "Custom Styling Information"! Streamlining! Lowering! Sport Changes! "Hollywood Roadster Plans"! 2 Speed Conversions! (Covers All Cars)—"Large Manual" plus Equipment Catalog plus "Hot Rod Handbook"—all three only \$1.98. Almqvist Engineering, Milford 11Z, Pennsylvania.

"SPEED Equipment" bargains—California mufflers \$4.50, V-8 Duals \$15.90, Chrome carburetor stacks 98c, Duals Manifolds \$9.95, Chrome echo cans \$1.55, Racing camshafts \$29.95 exchange, Hi-compression heads \$19.75. All popular brands—Big illustrated catalog 25c (Dealers Wanted), Almqvist Engineering & Mfg., Milford 13Z, Pennsylvania.

"SPEED & Power" Handbook—Tens of thousands have been sold! 128 pages! Covers "Jet Engines"—"Racing Frames"—"Braking Characteristics"—"Dynamometers"—"Reciprocating Masses"—"Gear Ratios"—"Dual Pipes"—"Fuels"—"Porting"—"Balancing"—"Lowering"—"Relieving! Breathtaking methods—Authentic—Direct from California Covers Crosleys to Cadillacs—All makes. Build your own Dual Manifolds, Superchargers, Hot Cams, Water Injectors, Hi-Compression Heads, Mileage Devices. Save many dollars! Get racing speed, lightning acceleration, dynamic power increases from any make passenger automobile! Build fast Stock Cars, California Roadsters, 160 M.P.H. Rods! Get construction drawings! Tuning Techniques! Speed Tricks! Economy secrets! Ingenious formulas! Special 50 chapter Library Edition, includes "California Automobile Customizing"—Color Photographs, Drawings, (Newest Ideas), Conversions, Re-styling all makes, Streamlining, Channelling, Chopping, Complete—\$1.98 postpaid including 1950 Speed Equipment Catalogues, Newhouse Automotive Industries 5805-A 2, East Beverly, Los Angeles 22. See page 43.

SAVE Gasoline, oil, tires, brakes—New Illustrated Economy Manual. Get more power, speed, better automobile performance. Introduces 17 new Economy products—Super sparkplugs, Water-oil injector, Rocket booster, Mileage motor, etc. Special 50c. National Automotive Research Corporation, Venice 17, California.

BIG New Catalog—Over 500 racing, hot rod, speed equipment, auto parts and Hollywood Accessories! Pictures! Speed Tips! Customizing! Mileage Information! Lowest prices! Illustrated catalog 25c. Almqvist Engineering, Milford 17Z, Penna.

FREE Trial Ford "Speed and Power" manual! We will send you on approval, 128 Page book full of cutaway construction drawings, photos, and understandable technical data. Includes information on installing V-8 motor in Model A chassis, hydraulic brakes for any Ford, roadster and fast car information. How to rework V-8, Mercury, Ford 6, Zephyr, Model A engines for speed. If you don't agree this is the finest hot rod manual you've ever seen—just send it back within 10 days. If satisfied, send \$2.00 to California Bill, Box A-7, Eagle Rock, Los Angeles.

WATER Vapor Injector, complete \$1.00. Vapor-Air, Box 8129, Kansas City, Mo.

NEW Clymer Books—German Racing Cars and Drivers, prewar, postwar, \$2.00—Chevrolet Owner's Handbook gives service data all Chevrolet cars 1929 to 1950 including Powerglide, \$1.50—Catalog all new 1950 American Automobiles, photographs, technical descriptions, specifications, automatic transmission information, \$2.00—Grand Canyon Economy Test complete book results and technical information, \$1.50—Outboard Motor Complete Service Manual, \$3.50—Motorcycle Road Racing world famous riders, motorcycles, \$2.00. All Postpaid, Clymer, Dept. 7-B 1268 So. Alverado, Los Angeles 6, Calif.

NEW "Insert Type" Catalog—Only 35c! Contains Hot Rod and Midget racing histories, professional speed tuning hints, highway and racing engine specifications; also pictures, information, prices on speed, power, custom accessories! We'll send you insert pages containing latest up-to-date changes Absolutely Free! Ansen Automotive Engineering, 3801-PS W. Jefferson Blvd., Los Angeles 16, Calif.

2 AUTO SUPPLIES & EQUIPMENT

BRUSH Plating Outfits connect to a battery. No tanks or shop required. Free particulars. Gunmetal Co., Avenue K, Decatur, Illinois.

SAVE gasoline! Sensational game needles. Free trial—See page 53.

"BURN Water in Your Car"! Free illustrated information. Write—Neher Industries, La Verne 6, Calif.

MOTORISTS save gasoline by Vacuumating overrich mixtures. Fits all cars. For Free particulars write Vacuumatic, Dept. 1628, Wauwatosa, Wis.

JUST OUT! Get largest auto accessory and parts catalog in world. Over 15,000 items, including Hollywood accessories, hi-speed equipment, rebuilt engines; all parts and accessories for all cars, trucks. New, used, rebuilt! We have that hard to get part! Completely illustrated, jam-packed with bargains. Send 25c. J. C. Whitney Co., 1919-T Archer Ave., Chicago 16.

NEW and used guaranteed parts for civilian and Army cars and trucks. Largest stock in America Mail orders. Pioneer Auto Wrecking Company, 788 W. 13th Avenue, Denver, Colorado.

FROM Speedway to Roadway! Track-proved hi-speed heads, manifolds now available for any passenger car! No special tools needed! Increase horsepower 25%! Astounding getaway! Free illustrated catalog. Speedsport, 6215-F Diversey, Chicago 39.

MAKE yourself super device, saves 45% gasoline guaranteed, purifies oil. Plans \$2.00. Mike Brodie, Vilna, Alberta.

WELDING bodies, frames, fenders. Pays with Hobart Arc Welders. Easy terms. Free Catalog, Box 279-P-702, Troy, Ohio.

CHEVROLET Parts. Scarce motor, body, sheet metal parts. Grossman Chevrolet, Minneapolis, Minnesota.

WHEEL alignment recorder. Drive over. \$16.98. Guaranteed. Align-A-Matic, Box 94, W. Orange, N. J.

PISTONS—1907 to 1950 any make. Merryman Co., Lawndale, California.

3 AUTO TRAILERS

BUILD Your own Trailer. Save Money. Have every feature you want! Plans for house, sport, camp and utility trailers. Catalog describing 9 models 10c, 15c in Canada and overseas. Jim Dandy, Box 125-B, Wausau, Wisconsin.

4 MOTORCYCLES BICYCLES, SUPPLIES

MOTORCYCLE Magazine—Worldwide Coverage. Yearly Subscription \$1.00. Sample 15c. Motorcycle News, 5424-H Sawyer, Chicago 25.

MOTORS, Motorbikes, Motorscooters, Motorcycles, Parts & Accessories. Rush 25c for Bargain Sheet, Mickey Rouse, Dunn, N. C.

1947 Salisbury motorscooter \$20 (needs engine repairs); James motorcycle \$25; Motoscoot \$15; Servicycle \$30; Midget car kits \$25; Wards engine \$4, other gasoline engines as low as \$2. Send 25c (35c for First Class Mailing) for latest Directory Number Thirty-Six, just out, listing these and hundreds of other bargains in Midget Cars, motorscooters, motors, homebuilders parts, plans, etc. (Mailorder only), Midget Motors Directory, Athens, Ohio.

"REBUILT and Tested 1½ to 3 H.P. Engines for Motorbikes, Motorscooters, Small Autos, Farms, Shops, etc. \$9.00 to \$30.00. Send \$1.00 for Forty Page Catalogue, Manual & Parts Book so you can order properly for immediate delivery. Cauffiel Motor Industries, Dept. 121, Temperance, Mich."

KNEEACTION Moto-Scoot \$10; motorbike (front and rear brakes) \$5; Whizzer motorbike with clutch and all attachments \$25; Indian motorcycle \$30; good midget car \$35; tire-wheel combination \$2.50. Rush 25c (35c for first class mail) for new catalog #945 listing sensational bargains in motors, motorscooters, motorcycles, Servicycles, midget cars, etc. Associated, Box 1764-CS, Toledo Ohio.

SPECIAL—1946 Whizzer in Schwinn bicycle \$20. Also Cushman motorscooter (good tires and lights) \$15; Shaw bicycle motor \$15; midget car \$15. Rush 25c (35c for first class mail) for new Summer catalog #17 listing many other amazing post-war bargains in wheels, engines, motorscooters, midget cars, monocycles, motorettes, etc. Gail, 538 Erie, Toledo, Ohio.

POPULAR SCIENCE OPPORTUNITIES

RECONDITIONED motorcycles and motors. Chromium accessories. Complete stock Indian parts. Expert rebuilding. Fast service. Indian Motorcycle Sales. Kansas City 1. Mo.

7 ELECTRICAL SUPPLIES & EQUIPMENT

LAMPS—Building, wiring made easy by charts and directions in 56 page illustrated lamp parts catalog. 25c. Gyro Lamps, 5402B Clark, Chicago 40.

32 VOLT appliances—World's largest line. Catalog Free. Haines Corporation, Dept. P. Minneapolis, Minn.

FREE CATALOG—Motors, Generators, Welders from Aircraft Generators, Water Softeners, Automobile Air conditioning, Uranium Locators, many other Electrical Bargains, LeJay Company, Minneapolis, Minnesota.

FANS—Parts, Kits, assemblies. Bargain list 10c. Engineering Sales, Box 458, Hopewell 3, New Jersey.

50 FT. heavy duty extension cord with bulb guard. \$2.98 postpaid. Tom Sheehan, 7156 Van Buren St., Chicago 7, Ill.

LAMPS—Build own Originals. Parts Wholesale, any amounts. Catalogue 10c. Brown Lamp Co., No. 501, Wellston, St. Louis 12, Mo.

ELECTRIC Pencil: Engraves all Metals \$1.25. Beyer Mfg., 10511-C Springfield, Chicago 43.

8 WELDING, SOLDERING, PLATING

WELDING builds paying business with Hobart "Build-Your-Own" Portable. Free catalog. Box 279-P-704, Troy, Ohio.

RADIATOR Repairing Books, Supplies, Equipment, Gasoline Torch. Write for circular. Curfman Mfg. Co., Maryville, Mo.

WELDERS: 1/6" metal \$3.95. 1/4" \$6.45. Essay Manufacturing, Quincy 69, Mass.

9 AIR CONDITIONING & HEATING

AIR Conditioner. Save \$300.00!! Build your own from junked Refrigerator. Send 50c for instruction Booklet. John Schmidt, 4809 N. Seeley Ave., Chicago 25, Ill.

10 MACHINERY, TOOLS, SUPPLIES

DRILL GRINDER for twist drills. \$2.95. See ad on page 237.

8" **POWER Saw** Bargain from Mfg. All steel construction, fully adjusted table and guide heavy duty Bronze bearings. Knobs in bright steel. Will compete with any saw at double its Price. Only \$32.95. Limited number. Wooten Company, Box 228, Lumber City, Georgia.

POWER Tools. Big savings when you build your own with Lewis castings. 23 wood and metal working tools with blueprints. Most can be completed with lathe and drillpress. Commercial quality. Ideal for home shops, schools, small manufacturing. Catalog 10c. Lewis Machine Tool Co., 3217 Union Pacific Ave., Dept. S, Los Angeles.

CONCRETE block machines \$39.50. Standard sizes. 400 daily. No expensive pallets needed. Free catalog. Concrete Appliance Co., 5129 S. Compton, St. Louis 11, Missouri.

13 BATTERIES, GENERATORS, ETC.

EDISON Nickel Batteries. 37 to 600 ampere. Also Kits with Edison Plates; make your own. Interesting literature. Hawley Smith Co., Croton Falls 2, N. Y.

14 BOATS, OUTBOARD MOTORS, ETC.

STEERING Wheels, windshield brackets, from \$6.95. Modern fittings "Water Skills," at lowest prices. Complete pre-cut plywood boats. Bargains galore. Folder 10c. Marine, Box 681, Mendota, Minnesota.

NEW, used, rebuilt marine motors. Marine conversions, fittings. Free Catalog. Stokes Marine Supply, Dept. 23, Coldwater, Mich.

BOATS—Runabouts, row, car-top. Completely pre-cut kits from \$29.95 including freight and paint. Literature 10c. Minnesota Marine, 3207 Fremont So., Minneapolis 8, Minn.

MARINE conversions for Ford and Jeep engines. Catalog 10c. Lehman Manufacturing Company, Department A, Newark 2, N. J.

BUILD a better boat than you can buy for the money, with Ozarka's exclusive laminated-rib construction and carefully pre-formed and pre-fitted parts. Save to 55% on all popular types from simple car-top models to one-design knockabout sailboats, priced from \$39.50 to \$329.00. Shipped complete, ready for easy assembly. Send 25 cents for literature, refunded on first purchase. Ozarka, Inc., 770 Borden Lane, Woodstock, Illinois.

FULL size, cut to shape boat patterns, blueprints, 7 1/2-38 feet. Illustrated "Build a Boat" catalog. 25c (coin). "How to Build Boats" book, \$1.00. PolyWog Houseboat Plans \$10. Marine Catalog \$1.00. Cleveland Boat Blueprint Co., Dept. A-77, Cleveland 13, Ohio.

BUY our conversion parts to change your auto engine into a high-grade marine engine. Marine manifolds, transmissions changed to high speed reverse. Marine bronze pumps, propellers, shafts, couplings, stuffing boxes, struts, rudders, etc. Buy direct from the factory and keep the dealers' profit for yourself. Money Back Guarantee. Conversion Parts Company, 277 Adams St., Boston 22, Mass.

FORD and Jeep Marine conversion kits. Request catalog. Arthur Gershel, Dept. O, 51 Chambers St., New York 7, N. Y.

BUILD A SURFBOARD for rescue work, sunning, diving, paddling. 14' hollow type. Blueprint, tips on simple construction—\$1. Water Sports, 745 McKnight Building, Minneapolis 2, Minn.

SAVE 2/3 cost. Assemble your own boat. Complete plans and boat parts machined ready for assembly. No experience necessary. Rowboats to cruisers. Illustrated catalog 25c. Midwest Boat Company, Menomonee Falls, Wisconsin.

OUTBOARD Runabout Boat Kit for 5 to 10 h.p. Seats four, lightweight. Easy to assemble. \$79.50. Send 25c for catalog covering all types. Brooks Boat Company, Dept. PS, Carrollton, Michigan.

15 ENGINES, MOTORS, ETC.

WINDING Data, listing 225 motors, single and three phase. \$1.00. Motor Data, Box 7631, Kansas City 3, Mo.

WELDER bargains. AC or DC. Engine or Electric Drive. Portable or Stationary. Write needs to Box 279-P-705, Troy, Ohio.

HOTTEST surplus list in the country. Electronics, Hydraulics, Aircraft, Gadgets. Dick Rose, Everett, Washington.

MOTORS: 1 horse \$35. 3/4 \$24. 1/2 \$15. Twin cylinder compressors \$17.50. Fans 32 volt \$3.75. Butler, 1885 Milwaukee Chicago 47.

GIANT Electric Steam Engine. Powers all models. 1/20 Horsepower. \$9.98 Prepaid. Money-Back Guarantee. Send Check or Money Order. Stanley & Company, 1613 Orange Grove Avenue, Los Angeles 35, California.

16 AMERICAN POLICE JIU JITSU

DEADLY Judo—Fiercest fighting technique. Trick knockouts. (Over 200 illustrated pictures.) Expert instructions—Three volumes Complete \$2.25. Variety House, Box 46-A Wall Station, New York 5.

18 BODY-BUILDING COURSES

BARBELLS—finest quality \$7.98 up. Catalog Free. Lurie Barbell Co., 1729-S3 Rockaway Parkway, Brooklyn, New York.

PHYSICAL Perfection. 12 Courses \$2.00 (news and picture 10c). Sid's System, P.S.M., Southgate, Calif.

BARBELLS. Build Muscular Bodies. Illustrated. Catalogue. Jackson Barbells, Springfield 7, New Jersey.

BARBELLS. Dumbbells. Exercise equipment. Courses. Free booklet. Good Barbell Co., Reading, Penna.

19 SPORTING GOODS, GUNS, FISHING TACKLE, ARCHERY

SPECIAL 20 Assorted Spinners for trout, bass or pan fish. Postpaid \$1.00. Box 313, Lewiston, Idaho.

5,000 **BARGAINS**. Firearms, binoculars, war relics, catalog 40c. Smith Museum, Runnemede, N. J.

POCKET PAL: Razor sharp sports-knife. Free replaceable blades. Trims pork rind, leaders, flies, baits. \$1.00. Nelson Co., 220 Kellogg, St. Paul 2, Minn.

"OVER 500 guns, modern, obsolete. List 10c coin. Ed Howe, 26 Main, Coopers Mills, Maine."

SEND 10c for list 100 used guns, Frayseths, Wilmar, Minn.

SEND now for this fascinating, new, free, Richardson 32-page booklet containing 357 fishing Tips, compiled by the expert fishermen who make Richardson Rods—the fishing rods that are tagged with the "Sign of the Fish!" For your copy, sent without cost or obligation, Print Your Name And Address On A Penny Post Card and mail to Richardson Rod & Reel Co., 3179 N. Sawyer Ave., Chicago 18, Ill.

190 **PROFUSELY** illustrated pages antique and modern pistol, sword, etc. values. 50c. Robert Abels, PS860 Lexington Ave., New York 21.

20 FIELD GLASSES, TELESCOPES, ETC.

POWERFUL astronomical telescopes easily made. Perfect lenses and instructions; 100x \$3.00; 100x and 200x \$4.00; 100x, 200x and 400x \$6.00. Full power, clear vision guaranteed. Instructions alone 10c. Suffolk Science Service, Riverhead, N. Y.

TELESCOPES. Binoculars. Microscopes—big bargain catalog free. Brownscope Company, 24 West 45th Street, New York.

"**FREE**" Catalogue! Thousand war surplus optical bargains. Lenses, Prisms, Telescopes, Binoculars, etc. Send \$1.00 for 10 Lens Hobbyist Set and Project booklet. G. Jaegers, 93-08—95th Avenue, Ozone Park 16, N. Y.

BINOCULARS—Guaranteed repairs. Free estimates. Dealers invited. Tele-Optics, 5514 Lawrence, Chicago 30, Illinois.

ILLUSTRATED Catalog and Book. "How to Select Binoculars" Only 10c. Bushnell Importers, 43-P7 East Green, Pasadena 1, California.

WAR Surplus Bargains. Binoculars. Telescopes, Sextants. Millions of Lenses, Prisms, Reticles, Eyepieces, Objectives, etc. Mail 10c for Big "Catalog." Send \$1.00 for Stock "Catalog"—10-piece Lens Kit and Big Instruction Booklet. Edmund Salvage Co., Barrington, N. J.

GIANT. 100 power astronomical telescope with 6 ft. tripod (10,000 area magnification) Clear Vision, full power guaranteed. \$15.00 F. O. B. factory. Suffolk Science Service, Dept. TC, Riverhead, N. Y.

SUN Projector lens doubles utility of all astronomical telescopes. \$2.00 postpaid. Suffolk Science Service, Riverhead, N. Y.

REFLECTING Telescopes, completely assembled. 60X. \$25.00. Guaranteed Observatory clearness. Free information. Skyscope, 475 Fifth Avenue, New York 17.

ASSEMBLE and Save—Powerful 5" astronomical telescope kit; aluminum mirror, diagonal, eyepiece elements. Simple assembly directions. \$12.50. Other sizes available. Free bulletin. Rake Instrument Laboratory, 104 Booram Ave., Jersey City, New Jersey.

24 DOGS, BIRDS, PETS, RABBITS

MAKE Big Money! Raise Chinchilla Rabbits. Cash markets supplied for your production. Write today! Rockhill Ranch, Sellersville 16, Penna.

SEE Golden Hamster ad on Page 35. Shows picture of Hamster.

NATURALIST'S Hobby Catalog 10c. Reptile Bulletin 5c. European lizard 75c. Chameleon 35c. Newt 35c. Quivira Specialties. Topeka 10, Kansas.

ANGORAS. Giant Chinchillas. White Giants—World's most profitable rabbits. Finest pedigree, heavy-producing, prize-winners. Literature free. Grinstead's Edwardsville, Illinois.

RABBITS: New Zealand, Ringland Rabbitry, 1726-30th, Des Moines 2, Iowa.

MAGILL'S Hamsters. Finest Breeding Stock, Supplies and equipment. "Hamster—Tips," including illustrated literature 25c. Magill's Hamstery, Box 430-T, Springfield, Missouri.

DOG Collars. Name address tags. Write. Free Bargain Catalog. The Dog Collar Works, Maysville, Ga.

HAMSTERS—Moneymakers. Odorless. Noiseless. Free instructions each pair. Information: Dixie Hamstery, 502-D, Trinity Lane, Nashville 7, Tennessee.

POPULAR SCIENCE OPPORTUNITIES

RABBITS. White Flemish Chippewa Rabbitry. R. F. Hohn, R. 4, Chippewa Falls, Wisconsin.

MONEY! Raising hybrid rabbits send \$1.00. Ray Smith, R. 6, Box 41B, Eldorado, Arkansas.

RAISE GUINEA PIGS. Big demand. Markets guaranteed. Booklet free. Taylor, B426B, Hapeville, Georgia.

\$50 WEEKLY Raising Angoras. Free illustrated Booklet tells How. Wilson's, Stanton 18, Calif.

HAMSTERS. Finest pedigreed breeders. Free illustrated literature. Mount Clemens Hamstery, Mount Clemens, Mich.

RAISE Highly Profitable Angora Rabbits. Plenty cash markets. Details free. White's Rabbitry, Newark, Ohio.

FOR Your Canary or Parakeet. "Tweet Treet" Finest Songfood Made—50c Postpaid—Parkview Pet Shop, 2222 N. Clark, Chicago 14, Illinois.

25 FROG RAISING

"RAISE FROGS!" New book tells how! Illustrated Literature Free. Marlboro-B, Box 7002, New Orleans 19, Louisiana.

30 FARMS, OTHER REAL ESTATE

STROUT'S Golden Anniversary Farm Catalog Over 2800 outstanding Bargains! Coast-to-Coast; 32 states. Mailed Free! Strout Realty, 255-ZB-4th Ave., New York 10, N. Y.

GOOD Farms—Ranches. Washington, Minnesota, Montana, Idaho, Oregon, North Dakota. Dependable Crops, favorable climate. Write for literature, lists describing typical farm opportunities. Specify which state. J. W. Haw.—Northern Pacific Ry., 120 St. Paul 1, Minnesota.

OZARK Lands for All purposes. Actual river frontages. 5 acres \$90.00 and upwards. Free list and literature. Hubbard, 424-H, Minnesota Ave., Kansas City 4, Mo.

BIG Free Summer Catalog, farm bargains. Many equipped. Illustrated, many states! United Farm Agency, 428-PS BMA Bldg., Kansas City 8, Mo.

32 PROFITABLE OCCUPATIONS

BE independent, be secure, have your own profitable business—earn \$10 and more a day making beautiful, fast-selling lamps at home. No equipment needed. Illustrated course teaches you quickly. Course, parts catalog, wholesale price list—only \$2. Gearon Co., Dept. 200-A7, 27 S. Desplaines, Chicago 6, Ill.

\$5000 FROM half acre growing Ginseng, crop bought. Particulars 10c. Associated Growers, 1169 Corydon, Winnipeg, Canada.

\$40.00 WEEKLY. Made growing mushrooms. Fresh. Dried. Dominion Patent 331.583, free spawn. North American, 169Y Yonge, Toronto, Canada.

FREE Book "How to Make Money with Home Workshop" describes amazing methods used by hundreds of successful craftsmen. Tells what to make, how to sell workshop output spare time. Write at once for details. Remember it's free! Craftsman, 115-B7 Worth St., New York City.

LIFETIME income as Notary Public. Appointment assistance. Stationers, Helotes 50, Texas.

TRAVEL free throughout world in post-war Merchant Marine. Vacation or exciting career. Salaries High. Men, Women. 1950 guide tells how. Only \$3 American Seamen's guide, 545 5th Ave., New York City.

INFORMATION—Money making plans and Wholesale supply sources will increase your income! Write. Reynard Supply, Smithfield, Ohio.

LEARN Watch-Clock Repairing at home—Inquire Modern Technical Supply, 55-PS West 42nd Street, New York 18.

ANALYZE handwriting; earn real money! Complete outfit 25c. Dr. Flury, Box 7A, Darby, Penna.

LEARN Building Design, or design your own home or cabin. Tech-Talk Design, 19375 Charleston, Detroit 3, Mich.

"10,000 Full-Fashion Nylons; Rayon, Cotton Socks, 8c pair; Underwear; Chenille Goods, Sample Razor Blades. Complete stock list, 25c. Sibert Company, Chattanooga 4, Tennessee."

RAISE Fishworms. Easy. Profitable. Send 25c in coin for complete instructions. Huffman's Worm Ranch, Rives Junction 5, Michigan.

33 BOOKS, PERIODICALS, ETC.

MAGAZINES (back dated)—foreign, domestic, arts, Books, booklets, subscriptions, pin-ups, etc. Catalog 10c. (refund). Cicerone's, 86-22 Northern Blvd., Jackson Heights, N. Y.

"ADULT Stories." 25c. Ten—\$1.00! Free lists! Hirsch, Spring Valley 3, N. Y.

BOOKHUNTERS! All Subjects. Send Wants! Jaher Book Service, 620-K East 178 Street, New York 57.

ADULT Books—Unusual—Revealing—illustrated. Five \$1.00. Catalogs 10c. Kogan, 1032-DP, Church Annex, New York 8.

HARD-To-Find Books supplied. Send wants. Pierce's, Winthrop, Iowa.

DO Dinosaurs Interest You? Do you wonder what went on here millions of years ago? Write for booklet D. The American Museum of Natural History, New York 24, New York.

BACK-date Magazines. Specific issues; years. Arkell's, Tarzana 2, Calif.

INTIMATE Imports. Adults only! Choice items! Darling Books! Interesting illustrated literature 10c. Box 8636P, Hollywood 46, Calif.

UNUSUAL Books. Novelties. Curios. Catalogue 35c. Box 216, Herkimer, N. Y.

NATIONAL Geographic Magazines, 1888-1950, any issue. Periodical Service, Box 327-PS, Swarthmore, Penna.

35 MAGIC TRICKS, PUZZLES, ETC.

WE supply every noted magician. Large professional catalog 50c. Holden's, P220 West 42nd Street, New York.

MYSTIFYING Ace Disappears from between two Cards Instantly. Complete Trick Easy to do FREE if 25c is sent for Big Catalog 500 Amazing Magic Tricks. The Magician, 2463-S Kensington Ave., Philadelphia 25, Pa.

200 ELECTRIC stunts, 110 volts, \$1.00. Cutting Sons, Los Altos 2, Calif.

MAGICIANS' Gamblers' secrets exposed. Cards, Dice, Punchboards, Slot Machine. Catalog 10c. Book Co., Box 671, St. Louis 1, Mo.

VENTRILOQUISM Taught. 3c stamp brings particulars. Smith, 801 Bigelow, Peoria 5, Illinois.

VANISHING Quarter trick and catalog 25c. Sterling Magic Co., Royal Oak, Mich.

FREE!!! Hot pepper gum, 24 other tricks, with illustrated catalogue 25c. (refund first order). Fink Co. (B-1618), Philadelphia 5, Pa.

500 TRICKS. Douglas famous catalog 27 now only 10c. Unequaled service to magicians for 30 years. Send 10c today. Douglas Magicland, Dept. 2, Dallas, Texas.

MAGIC package "Extodo" unique tricks 50c. Catalog free. Magiden, 716 Pine, St. Louis, Missouri.

TERRIFIC E-Z Magic Tricks and Jokes. Hundreds of items to select. Send 25c for 2 great mental tricks plus Free catalogue. Mail Sales Mart, 773-5 Willoughby Ave., Brooklyn 6, N. Y.

"LET friends cut any rope three times. You restore immediately. 50c. Playtime, 216 Centre St., N. Y."

CORNY tricks? Puh! Meet 'Memoprop'! Become a mental superman overnight! Floor everybody! It's revolutionary! \$1.00. Bijou, Box 1727-V, Hollywood 28, Calif.

512-PAGE catalogue of 2500 tricks, pocket, parlor, stage. World's Finest Magic. Send \$1.50 for catalogue (refund first \$6.00 order). Kanter's, S-1311 Walnut, Philadelphia 7.

VENTRILOQUIST Dummies. Catalogue 25c. Be a Ventriloquist. Free Literature. State your age. Maher, Box 36-S75, Kensington Station, Detroit 24, Michigan.

BE a Magician. Large professional magic catalog of latest tricks, 35c. Ireland, F-109 North Dearborn, Chicago.

37 COIN COLLECTING

43 MIXED Indian pennies \$1.00, 33 Diff. Foreign \$1.00. Chelsea, 26 West 18, N. Y. C. 11.

FREE! Foreign coin, banknote and Coin Collectors' Illustrated Catalog to approval service applicants. Send 3c postage. Tatham Coin Co., Springfield-D50, Mass.

GET Profit and Pleasure in collecting old coins. Send 10c for 56-page illustrated coin catalog. You'll be delighted with it. Send for it now. B. Max Mehl, 374 Mehl Building, Fort Worth, Texas. Largest rare coin establishment in U. S. Established 50 years.

OLD Money Wanted. Will pay \$100.00 for 1894 Dime, S. Mint. \$50.00 for 1913 Liberty Head Nickel (not Buffalo). Big premiums paid for all rare coins. Send 4c for Large Coin Folder. May mean much profit to you. Numismatic Co., Dept. 30, Fort Worth, Texas.

WORLD'S greatest magazine for coin collectors and two wooden nickels 10c. Lawrence Bros., Anamosa, Iowa.

U.S. coins lowest prices. Send stamp for lists. Hutchinson, 3463 I Street, Philadelphia 34, Penna.

HALF dollar over 100 years old, large cent, two cent, three cent, 5 different Indian cents \$2.00. Walton, 7 Water, Boston 9, Massachusetts.

3-LEGGED Buffalo Nickel \$1.50. Giant Bargain. Retail Catalogue 15c. Bebee's, 1180 East 63rd, Chicago 37, Illinois.

40 STAMP COLLECTING

ZOWIE-E-E! A Barrel of Fun for only a Dime! 500 United States Stamps—Absolutely unpicked and unsorted, just as received from church missions. Many varieties, including large commemoratives, airmails. High denominations up to \$5.00! Stampdom's biggest package of fun, and you might find something really valuable!! Price only 10c to serious approval service applicants. Money back if not delighted. Illustrated bargain lists with each order. Mystic Stamp Co., Dept. 55, Camden, N. Y.

200 DIFFERENT, including Roosevelt triangle, 5c to approval applicants. S. Avalon Stamp Co., Springfield, Mass.

WOW! \$10.00 Worth of Fun 10c! What a treasure hunt! Big package 50c! Foreign Stamps, including airmails, pictorials and others from the world over; stamps worth up to 25c each. This offer sent for 10c to Approval Applicants Only. Jamestown Stamp Co., Dept. 6, Jamestown, New York.

POSITIVELY Greatest Free Offer! Latest Scott's International \$6.00 stamp album—covering entire world, contains 36,000 illustrated descriptive spaces; Scott's 1950 Standard \$7.00 catalogues "Philately's Encyclopedia"—absolutely Free to applicants for foreign approvals becoming customers. Approval Service, P. O. Box 1700, San Francisco, California.

FREE! Powerful magnifying Glass—to approval applicants; also big bargain lists. Jamestown Stamp Co., Dept. 202, Jamestown, New York.

"HOW To Recognize Rare Stamps" Book Profusely Illustrated Only 10c. Kenmore, Arlington 74-H9, Mass.

FREE! 100 Worldwide different stamps to approval buyers. Big U.S. and illustrated bargain lists sent with approvals. Bookman, Maplewood 1, N. J.

FREE—Famous Americans Set, Flag Set, National Parks Set, and Presidential Set to \$5.00. A total of 90 Stamps Free to Customers for our unsurpassed U. S. and foreign selections. Send 3c for 15 of the above Stamps and full particulars. Triboro Stamp Co., 145 Nassau St., Dept. 207, N. Y.

WORLD'S Largest Stamp (7½ x 14 inches). A real curiosity! Retail for 50c, only 3c to approval applicants. Tatham Stamp Co., Springfield 50, Mass.

FREE—Rare stamps from mysterious Nepal, plus octagonal (eight sided stamp), Giant triangle, gorgeous diamond, mammoth, midget stamps, value exceeds \$2.00. All free to approval buyers. Stamps, Box 58, Santa Ana, California.

1050 DIFFERENT Stamps given to approval applicants becoming customers. Send 3c for particulars, lists and approvals. Bryson Stamp Company, Drawer F-30, Rossford, Ohio.

POPULAR SCIENCE OPPORTUNITIES

UNITED States stamps nearly 100 years old. Roosevelt set, others, 40c value—only 6c to applicants United States approvals. Wakonda, 140F Nassau, New York 7.

FREE \$25.00 Outfit Latest Large Scott album, valuable collection of 1050 all different beautiful stamps, airmails, triangles, diamonds, high values, etc. Plus watermark detector, tongs, "Stamp Finder" Magnifying glass, perforation gauge, hinges—actual value over \$25.00—but all absolutely free when you become a customer. Write for our foreign stamps on approval now. Americas' Stamp Service, Riverside, California.

DEALERS Wholesale catalog. Postage 3c. Franksco, 5031 Queensbury, Baltimore, Maryland.

PAY less. Buy more. Books of 1,000 at 1c & 2c each. Very good fillers. Attractive stamps. Adults only. Graveline, 14702 Troester, Detroit, Michigan.

TOPS! Our book "How to Collect Stamps". Send for your free copy today! Littleton Stampco, Littleton 29, N. H.

FREE—Cuba Roosevelt issue and illustrated catalog. Littleton Stamp, Littleton 11, N. H.

FREE—Illustrated Catalog! Kenmore Stamps, Arlington 74-C8, Mass.

FIRST U. S. (1847)—Government Reissues 5c, 10c, plus Giant Bargain U. S. Collection; only 5c to applicants U. S. approvals. Metropolitan, 140-K Nassau NYC 7.

FREE "Stamp Finder." Tells instantly country to which any stamp belongs. 32 pages profusely illustrated. Garcelon, Calais 18, Maine.

WHOLESALE lists to dealers. 3c postage. Grossman, 106 West 42nd, New York 18.

200 BRITISH Empire Stamps plus valuable publications only 3c. Kenmore Stamps, Arlington 74-B18, Mass.

750 FRANCE and Colonies stamps 10c. Littleton Stamp Co., Littleton 28, N. H.

FREE. Scott's International Album, valuable colorful collection, hinges, other big premiums. Full particulars with approvals. Raymax, 123-X William St., N. Y. C. 7.

10,000 DIFFERENT 1c each! Gordon Davison, Box 1019, Manchester, N. H.

FINE Approvals. Fast, personal service. What countries do you prefer? I'll send their stamps. Milton Skinner, 438 Locust, Long Beach 12, Calif.

"FREE: 100 Different World with Economy Approvals. Frederick's, 1028 North Irving, Arlington, Va."

FREE! Tiny Chinese "Midget" War set. Approvals. Seminole, Leeds 10, Ala.

"AUSTRALIA 100 Mixed—30c no approvals. Johansen, 739-45 St., Bklyn 20, N. Y."

FREE—World's only Giant "Cardboard" Triangle. Approvals. Beaman, Leeds 10, Ala.

FREE! New, large Egypt map stamp, 100 different stamps, premium coupon with approvals. E. Moublow, 740 Hegney, Bronx 56, N. Y.

51 DIFFERENT Greece and Albania 10c. Jumbo approvals. Chase, 1026 Walker Ave., Oakland 10, Calif.

FREE! Beginner's Packet! With Lists! Stampmart, Box 2071, Hartford 1, Conn.

OLD, scarce U. S. seconds on approval. Slightly defective bargain prices. Hearnfeld, Clintonhill Station, Newark 8, N. J.

1000 World Wide 67c; Pacific, P. O. Box 5704, Los Angeles, Cal.

PENNY Approvals By Country. M. H. Hoerning, 102, Farmington, Arkansas.

All DIFFERENT: 1,000—\$.90; 2,000—\$2.40; 3,000—\$4.60; 5,000—\$10.85; Lists Free!!! Stern, 1618 Ford, Shreveport, La.

1038 DIFFERENT STAMPS—\$1. Includes valuable Roosevelt Memorial Collection of 24 Commemoratives from 11 countries. Hundreds of other fascinating, unusual items. Regular \$10.50 value—just \$1.00 with Bargain Approvals. Money Back Guarantee. Zenith, 97 Nassau St., N. Y. 7.

FREE 100 stamps—Mail 50c for year's subscription "Junior Stamp Collector", Sta. A, Box 147, St. Petersburg, Fla.

FREE "Stamp Finder". Tells instantly country to which any stamp belongs. 32 pages profusely illustrated. Garcelon, Calais 18, Maine.

60 U. S. 10c. 30 Canada 10c. No approvals. Townsend, 458 Norton Parkway, New Haven 11, Connecticut.

307 ALL Different 15c. Beautiful collection of commemoratives, triangles, high values, bicolored stamps, etc., only 15c. Garcelon, Box 416, Calais, Maine.

GIFT—Tokelau Islands complete mint to approval applicants. Deane Stamps, Box 87, Miami 35, Florida.

WORLD WIDE Stamp List! Sample packet 25c. General Sales Service, 423 Brobst St., Shillington, Pennsylvania.

GENUINE "Goya Nude" set (Catalogs 55c) 15c. Approvals. Royal Stamp Company, Tamaqua 2, Penna.

110 DIFFERENT Hitlers, Roosevelt, Liberia, Haiti, etc. 10c. Buckey, PS-208 Ludlow Bldg., Dayton 2, Ohio.

2000 DIFFERENT Worldwide—\$2.50. Lists free. Beacon Sales, Northboro 3, Mass.

ABSOLUTELY Free—Gilbert Ellice, Cook Islands, Tonga, Seychelles, Ascensions—free to approval applicants. Viking, 130-P Clinton St., Brooklyn, N. Y.

AMAZING penny approvals! McIntyre, 14742 Burbank Blvd., Van Nuys, Calif.

LIBERIAN Triangulars, 10c with approvals. Vargo Stamps, 6044 South Fairfield, Chicago 29, Illinois.

PENNY Approval Bargains! Write Department PSM, 1267 Tutwiler, Memphis 7, Tennessee.

PENNY Approvals—Catalogue values ignored! Cole, 43-G Rinewalt, Buffalo 21, N. Y.

FLAG Stamp free with your request for U. S. approvals. Wenigman's, 1933 Patterson, Chicago 13.

FREE Sample newsy informative stamp weekly. Southern Philatelist, Box 1948, Miami 35, Florida.

LARGEST U. S. Commemorative! Unused 10c beauty plus priced-right U. S. approvals. Just 10c! Zaleyet, 55 West 42nd, New York 18.

500 DIFFERENT Only 25c with excitingly different beginners' approvals. Niagara Stamps, Niagara-on-the-Lake 20, Canada.

ROOSEVELT misprint 6 fingers, unique stamp free with approvals. Apex Stamps, Box 2188, Miami 13, Florida.

500 DIFFERENT! With approvals. 25c! Gateway Stamps, Box 662, LaCrosse, Wis.

STAMP Magazine! Copy Free! "Stamp Post." South Catalina, Pasadena 1, Calif.

15c CANADA Packet, 3c with approvals. Peterson, Box 31, St. Paul 2, Minn.

FREE! Scarce Atomic Bomb Airmail! Approvals. Star Stamps, Jamestown, N. Y.

100 EXOTIC Japan—All different—10c. Kenmore, Arlington 74-K8, Mass.

42 HOBBIES, COLLECTIONS

INVENTING can be an interesting and profitable hobby. Write for complete particulars. Institute of American Inventors, Dept. 30-E, 631-E St., N. W., Washington 6, D. C.

YOUR name on our mailing list brings catalogs, literature. State your hobby. Hobby Clearinghouse, Box 541, Indianapolis, Ind.

WANTED Old cigarette cards. Write Charles Eray, East Bangor, Penn.

UNUSED matchbook covers—100 different \$1.00—Catalog 25c—Charles Edelman 1311P East 84, Cleveland 3, Ohio.

50 DIFFERENT Army Embroidered Patches \$1. Other bargains. Insignia Mart, 703B Broadway, New York 3, New York.

44 ANTIQUES, RELICS, INDIAN GOODS

8 ANCIENT Indian arrowheads, \$1.00. Tomahawk \$1.00. List free. Lear's, Glenwood, Arkansas.

46 MINERALS & PRECIOUS STONES

GEMSTONES. Mineral specimens. Every variety. Lowest prices. Postcard brings free booklet. Plummer's, 2183D Bacon, San Diego 7, Calif.

35 COLORFUL Western Mineral Specimens, identified, carded, boxed, \$3.00 prepaid. H & B Minerals, 714 Francis, Houston 6, Texas.

47 CAMERAS, PHOTO SUPPLIES

BASS Says: Bargaingram 257 ready and waiting for you. The book which tells all the finest in new and used camera equipment, a veritable encyclopedia. Write, phone or call the sign of the old "Horse Trader". 39th year of satisfaction or your money back dealing. Bass buys, sells and trades. Bass Camera Company, Dept. AG, 179 W. Madison St., Chicago 2.

FREE Photographic Bargain Book packed with hundreds of sensational values in still and movie cameras, lenses and latest accessories. Super savings for you in new and used equipment. Liberal trade-in allowances, too, on your equipment. Write now for your free copy to Central Camera Company, Dept. 11-G, 230 S. Wabash Ave., Chicago 4 (Photographic Headquarters Since 1899).

KODACHROMES on approval. Name any Western National Park. We'll send selection. Douglas Whiteside, Yosemite, Calif.

ULTRA Powerful Telephoto Camera easily made. Trifling cost. Perfect pictures. Instructions 10c. Suffolk Science Service, Riverhead, N. Y.

BEAUTIFUL Pin-Up and artist model photos for your den 8-4 x 5 \$1.00. 32-4 x 5 \$3.50. Exclusive Releases. Centex, 930A W. Jefferson Dallas, Texas.

AERIAL Camera. AAF. K-21, new. Graflex, motor driven or manual, 24-volt or 110-volt with transformer. Original packing. Hundreds of uses, photographically or for parts alone. Complete except for lens and filter. Lowest price in country, extra-special, for limited time, \$24.50 with transformer, which can be used to operate surplus aeronautical motors and assemblies. No C.O.D. Check or money order with order. Amazing Bachman's, Dept. PS, 27 Herman Street, Rochester 5, N. Y.

PHOTOMURALS. Your negatives or ours. Catalogue 25c. Photomammoth, 12048 Vanowen St., North Hollywood, Calif.

PIN-UP and Artist Model Photos, 12 for \$1.00. Speed, Box 822A, G.P.O., N.Y.C. 1.

ART Negatives, Slides, Transparencies! Beautiful Hollywood Models! Posed for Art Study! For Adults Only! Send \$1.00 for 10 Fine Grain, Unretouched Art Negatives! \$2.00 for 5 Color Art Slides! \$2.00 for 50 unmounted B&W 35mm Transparencies! All Different! Jim Bradford, 1302-F Broadway, Burbank, Calif.

ADD "Spice" to home projection shows with old time nickelodeon slides, 2 x 2 Kodachrome. Write for free list. Nickelodeon Co., New Flender Bldg., Portland 5, Oregon.

48 PHOTO FINISHING

YOUR 8 exp. roll with 3 prints each good negative 45c. 2 each good negative 35c. One each good negative 25c. Reprints 3c. A few cents postage appreciated. L. A. Eastman, Bode, Iowa.

AMAZING Introduction offer. Film developed: 8 enlarged glossy prints 20c; 12 exposures—30c; 16—40c; 36—90c. Money back guarantee. Immediate delivery. Mail-A-Way Photo, Box 375, Fitchburg 44, Mass.

THE Photo Mill. Immediate service! No delay! Eight exposure roll developed and printed for 30c plus valuable coupon for eight reprints, four jumbos or two 5x7 enlargements for a slight additional charge. Film developed and jumbo prints 35c. The Photo Mill, Dept. O, 1511 Hennepin, Minneapolis, Minnesota.

16 DECKLEDGE Velox prints from any 8 exposure roll film developed 30c. 10c package of 100 mounting corners free. T. Skrudland, Lake Geneva, Wisc.

PLASTIC RING-BOUND ALBUM with 8 brilliant Jumbo Enlargements, including developing your film, only 35c post paid. Same Day Service! Calvert Studios, Box 1150, Binghamton, N. Y.

2 BEAUTIFUL Hi-Gloss prints each good negative and enlarging coupon with each 6 or 8 exposure roll developed 28c. Owl-photo Co., Weatherford, Oklahoma.

8 BEAUTIFUL Double Size pictures and roll developed 30c. 8 hour service. Free Mailers. Pacific Photo Service, Box 666, San Francisco, Calif.

LOOK! Five quality 8 x 10 enlargements \$1.00. Surgals, 3300 Beach, Chicago.

POPULAR SCIENCE OPPORTUNITIES

ROLLS developed. 16 prints 25c. Reprints 2c. Dick's Photo. Louisville 12, Ky.

10c PACKAGE of 100 mounting corners free with this ad. Roll developed and 8 oversize, enlarged jumbo, deckled prints 25c. 16 for 50c. Framed enlargement coupon free. Electronically exposed. Skrudland. 6444-X Diversey. Chicago.

50 PHOTOPRINTS, PHOTOCOPIES

PHOTOCOPY anything yourself. Papers, books. No darkroom. 8 1/2 x 11" complete. \$6.95. Fotoflek. 3751 St. John's Terrace, Cincinnati 36, Ohio.

51 MOTION PICTURES, SOUND EQUIPMENT

ART model films 16mm rentals exclusively. adults list. Enclose stamp. Revere Films. Box 1051. Detroit 31, Mich.

FILM Duplicating Machines \$68.50 Up. Details (M-K) 451 Continental, Detroit 14, Michigan.

GUARANTEED fresh anti-halo outdoor movie film! Weston 16! Daylight loading! Processing free! Three spools double 8mm. \$4.50! Six single 8mm for Univex. \$4.60! Postpaid! Catalog. Eso-S. 47th Holly. Kansas City 2, Missouri.

BASS Says: 39 years of leadership guarantees satisfaction. Finest Cine equipment. 8mm., 16mm., and 35mm., silent and sound. Write the old "Horse Trader". Satisfaction or your money back always! Bass Camera Company. Dept. A. 179 W. Madison St., Chicago 2.

BETTER 8mm and 16mm Movie Camera Film. Free Equipment Catalog. Better Films. 742 New Lots, Brooklyn 7, N. Y.

WILD Game films. 8mm. 16mm. Natural color, black-white. Taken in natural habitats by famed Eberhart organization. Send for free list. Wild Life Films. Dept. 7-PS. 6063 Sunset Blvd., Hollywood, Calif.

CLEARANCE SALE of 16mm features. Want a real buy in 16mm Sound FILMS? Take advantage of the I.C.S. SALE of 16mm sound Features—comedies, cartoons, novelties, musicals—new, used. Send for our giant list "A" today, stating machine you own (make and model). Institutional Cinema Service, Inc. 1560 PS Broadway, New York 19, N. Y.

SURPLUS 16MM movie film 25 ft. lengths, ten per \$1.00. Gramon's. 918 East 48 1/2 Austin, Texas.

8-16MM. Silent-sound films. Complete rental library. All latest subjects. Free catalogue. (sample film 10c). Garden Film. 317 West 50th. New York 19.

SUNSHINE and health Films available in 8mm and 16mm Tel-A-Film Co., 935 Cincinnati St., Dayton, Ohio.

SELL Cameras, Projectors, Film. Recorders, Typewriters, Appliances, Revere. Kodak, Weston, Royal, G.E. 25-40% Commissions. Diamond Company. 17 East 42nd Street, New York 17, New York.

SAVE 50% on movies. Free circulars. Fromaders, Box 637-B, Davenport, Iowa.

LEARN movie projection management. Free Catalog. Theatre School, Elmira, N. Y.

UNUSUAL Glamour films of beautiful models. Send 25c for giant Catalogue. Kasan Distributing Co., 1248 Pacific St., Brooklyn, N. Y.

NEW \$17.50 16mm. sound musicals, cartoons. \$9.95. \$8.95. New \$9.75 sound cartoons. \$5.95. Big bargain list free. Blackhawk Films. Dept. PSN Davenport, Iowa.

HOLLYWOOD Film Club... Intriguing 8 and 16mm. adventure films and dance films by international beauties. Discounts to members. Send only \$1 for sample reel and illustrated catalog. Specify 8 or 16mm. International Films. Dept. S-7. 1235 Vine Street, Hollywood, Calif.

ONLY at Camera Corner can you get these new, exclusive unusual model movies—never offered before. "Atomic Eve." "Happy Birthday." each. 8mm \$2.75. 16mm \$6.00. Sample strip and complete two-color brochure. Including new, exclusive listings, 10c. "Previews" #1 to #9—our famous projection-length sample shorts—still available at 50c each. (Specify 8mm or 16mm.) Camera Corner. 391 Bridge Street, Room 131, Brooklyn 1, N. Y.

52 MUSIC, MUSICAL INSTRUMENTS

FINEST Swiss Musicboxes, everlasting joy, apply trustfully. Kobler, P. Postmaster Neufeldstrasse 141 Berne, Switzerland.

SWISS Music Box. Plays continuously. Electrically operated. catalog 10c. Bell Music Box Company. Box 49, Planetarium Station, New York 24, New York.

VIOLINISTS! New bridge gives amazing tone. Fraser. 2025 Stark, Saginaw, Mich.

53 SONG WRITERS

SONGWRITERS—Honest, Outstanding Music writing offer. Len-Tex Studios, Leonard, Texas.

"BEST Deal! Lyric & Songwriters; Free Lyrody! Topical Emprise Corporation 1527 Highland, Box 42 SP, Louisville 4, Ky."

POEMS Wanted to be set to music. Free examination. Send poems. McNeil, Master of Music. 510-PS, S. Alexandria, Los Angeles, California.

POEMS wanted for musical setting. Send poems for free examination. Five Star Music Masters, 646 Beacon Bldg., Boston, Massachusetts.

POEMS WANTED. Percentage basis collaboration. Terry Tunesmith. 709 1/2 North Broadway, Oklahoma City 2.

WANTED! Poems for musical settings. Write Songwriters' Service, Clifton, N. J.

POEMS Considered for musical setting. Send poem for Free examination and useful Rhyming Dictionary. Richard Brothers, 46 Woods Building, Chicago.

54 RADIOS, SUPPLIES & EQUIPMENT

MAKE Simple. Tubeless. Batteryless. Distance-Getting Crystal Radios. Crystal and illustrated instructions 25c postpaid. Allen, 427-s, Clinton, Mo.

PRACTICALLY a Radio Course. No Knowledge of Radio necessary. Free Tester & Tools. Quizzes. Money-Back Guarantee. Order Today or send for Free Kit Katalog. C.O.D.'s accepted. Progressive Electronics Co., Dept. D. 497 Union Ave., Brooklyn 11, N. Y.

FREE—Send for latest radio catalog and bargain bulletin. Has thousands of top values in television, radio electronic supplies. Concord Radio Corp., Dept. KG-50, 901 W. Jackson, Chicago 7, Illinois.

15 TESTED one-tube circuits 25c, including "Radiobuilder," catalog. Laboratories. 578-T, San Carlos, California.

55 TELEVISION

TELEVISION sets. Any make. Factory prices. Lists free! Allied, 2503 No. 3rd Street, Milwaukee, Wisconsin.

56 BUSINESS OPPORTUNITIES

"HOW to start a successful mail order Business! The guide to sound, profitable mail merchandising. 25c. Manhattan House, P. O. 50 New York 28, New York.

LAMPS—earn money building and repairing in your home. Easy-to-understand wiring charts and detailed instructions in illustrated catalog showing all parts. Send 25c. Gyro Lamps. 5404 B Clark, Chicago, Ill.

CASH For your idea. 280 manufacturers need inventions, patented or unpatented. List free. Invention Bureau. 208-S Clinton, Oak Park, Illinois.

MAKE Money spare or full time, casting Metal Toys and Novelties. Big Wholesale and chain store demand for cast Metal Autos, Soldiers, Ashtrays, Banks, etc. Keeps manufacturers busy. Production moulds furnished for up to 100 and more casting per hour. No experience or special place necessary. Write for full information and illustrations of patterns needed. Metal Cast Products Co., Dept. E, 1696 Boston Road, New York 60, N. Y.

GOOD Paying Business Silvering mirrors, plating autoparts, reflectors, bicycles, bathroom fixtures, etc., by late methods. No tanks or shop required, outfit furnished. Free Booklet. Gunmetal Co., Ave. E. Decatur, Illinois.

EXTRA Money—No selling—operate vendors. Amazing profits, details Free. Silver King, Suite 282, 622 Diversey, Chicago 14.

OPERATE profitable mail order business. Write Walter Service, 4159-B East 112th, Cleveland 5, Ohio.

A FACTORY in your home garage! Mfg. and sales rights, mechanics' waterless hand cleaner, glass cleaner, and amazing "lazybones" auto cleaner-polish. \$500-\$600 monthly. No special equipment necessary. All formulas free. Western Aircraft Mfg., Dept. G, Los Angeles 6, Calif.

ENVELOPES addressed accurately, reasonably. Fast Service. We have capable addressers in your city. Glenway System. 5713-X Euclid, Cleveland 3, Ohio.

POPCORN Equipment. Potato Chip Outfits. Long Eakins Company, 5063 High, Springfield 99, Ohio.

BIG money! Spare or full time in your home. No Selling! Spray New Miracle Finishes. Plush and Suede, on signs, radios, automobiles, figurines, lamps, toys, etc. Our business is booming. Help us fill huge demand. Cash in now on Big Christmas orders. New easy Flok-Kraft methods. Material costs few pennies. You get dollars. Free samples, complete powerful money making plan free. Write now. Coast. 1002-K S. Los Angeles St., Los Angeles 15.

\$25 WEEKLY working two hours daily. No canvassing. No Manufacturing. Lycke. Box 2471-B, Cleveland 12, Ohio.

137 PLANS to make money local, mail order. Particulars free. Elite Co., 220-A Grand St., N. Y.

PEARL Finishing—New, Amazing—Huge Profits. Start Making Big Money first day. Free Facts show easy way to \$25 to \$50 per day at home. Absolutely no experience. Be first—scoop the market. Write Pearl-Kote, Dept. S. 2111 W. Manchester, Los Angeles 47, Calif.

RECAST old batteries into new. Latest achievements. Battery Laboratories, Minneapolis.

POPCORN poppers, peanut roasters, copper candy, caramels, corn kettles. Northside Co., Indianola, Iowa.

BRONZECRAFT Baby Shoe Mountings. All Metal Bookends, Ash Trays, Picture Easels—Beautiful Designs—America's Lowest prices. Sample mounting \$1.00 prepaid. Baby Shoe Electroplating instructions Free. Bronzecraft, 630 Newark Ave., Jersey City, N. J.

TEL-A-RAMIC news flash! Save time and money on your business correspondence. Write for details. Tepco, New Providence, New Jersey.

USE Your Home as magazine subscription station. Represent all magazines. Liberal commissions. No experience—no capital needed. Catalog, full details free. Write McGregor Magazine Agency, Dept. 510B, Mount Morris, Ill.

START Mailorder Bookshop—Everything furnished. 25c brings booklet, samples, exciting ideas. General Publications, Ossining 1, New York.

"YOU can actually see the metal flow on" with a TYCO Electro-plater! Electroplate Metals, Mirrors, Glass, Wood, Leather, Plastics! No tanks or expensive equipment. Start your own profitable Mirror and Plating business at home! Outfits furnished! Write for free booklet, TYCO Metals, Box 12008J, Houston 17, Texas.

\$124.50 WEEKLY Guaranteed! At home, sparetime, \$1.00 (deposit). Science Syndicate, San Antonio, Texas.

WRITE for free booklet and catalog telling how to earn substantial profits in your spare time by forwarding new and renewal subscriptions to all magazines for your friends and neighbors. Oldest U. S. Agency. Established 1869. Moore-Cottrell, North Cohocton, New York.

BE Appointed State Notary Public now! Details. Stationers, Helotes 50, Texas.

BUY Nylons direct from mill. Write for jobbers prices. Joy Hosiery Mills, Delawanna 14, New Jersey.

FREE Illustrated course casting novelties. Genuine latex for molds. Major Chemical Co., 164 Portland St., Cambridge, Mass.

QUALITY moldine latex \$2.25 Quart. Postage Extra. Free Model. Kendall, 108-L Central, Jersey City, N. J.

POPULAR SCIENCE OPPORTUNITIES

BORROW Money or obtain Capital for any purpose. Details free. Rains and Associates, Box 907, Station "A," St. Petersburg, Fla.

UNPAINTED Figurines. Beautiful models. Write for new wholesale price list. Oman, 642 S. Broadway, St. Paul 1, Minn.

MAKE money addressing envelopes. Our instructions reveal how. Glen Glenway, 5713 Euclid, Cleveland 3, Ohio.

SLOT Machines. Punchboards. Wholesale Catalog. Webb Distributing Co., 4966 West Chicago Ave., Chicago 51, Ill.

"MOLDING Rubber, sample 1/2 Pt. \$1.00; \$2.95 Qt.; \$7.95 Gal. postpaid. Molds made to order. Plastercraft Supply Co., 3051 St. Clair Ave., Cleveland 14, Ohio."

ELECTROPLATING—Complete 20 Lesson Course, \$10. Information Free. S. Hyde, 327 West 120th Street, Los Angeles 61, California. Established 1944.

MAKE MONEY EASY in your own Specialty Construction Business. Profit two ways—building outdoor fireplaces and supplying units. We show you how. Write Ohio Stove, Portsmouth 19, Ohio.

SENSATIONAL nylons guaranteed against runs. Nationally advertised. Not sold in stores. No experience or money needed. Also lingerie, robes, men's hosiery. Outfit, samples, etc. free. Wonderful opportunity earn big money spare or full time. See our full page advertisement on page 31. Kendex Corporation, Babylon 249, N. Y.

LIQUID Marble—Colorful, glossy! Molded. Brushed, sprayed! Cast Novelties. Statuary. Colored Tiles. Flexible Molds. Composition Floors. Particulars Free. Marbellizing Service, Edwardsville, Ill.

HOW To Set Up and Run A Mirror Shop! Resilver Mirrors. Make Chipped Glass Nameplates. Electroplating Salts and Rectifiers. John Sprinkle V90, Marion, Ind.

RAISE Money-making Angora Rabbits. No experience needed. big demand for wool. Send dime (coin) for latest folio. Write today. Anthony's, Box 1729, Dept. PS-7, Cleveland, Ohio.

BIG PROFITS in Popcorn & Concession Items. Send \$1 for New Instruction Manual & Catalog plus Mdse. Coupons worth \$5.00. Blevins Popcorn Co., Dept. P, Nashville, Tennessee.

LIQUID Rubber, make flexible molds. Free Sample. Chaney, 1130 E. 16th St., Jacksonville 6, Fla.

MAKE money making new greaseless doughnuts at home on electric machine. Wholesale to grocers, drug stores, cafes, hamburger shops. Send for free recipes and plans. S. Ray Company, 3605 South 15 Ave., Minneapolis 7, Minnesota.

WATCHMAKERS—Write today for proven facts about new profits from simplified chronograph watch repair. W.P.H.I., Desk 39, Chamber of Commerce Bldg., Pittsburgh 19, Pa.

\$35 WEEKLY! Home! Two hours daily! Free! Walsh, 894 Main St., Buffalo 2, N. Y.

MAKE Perfumes—Profitable Mail Order Business—Information free. "International," 6347 Parnell-PS-7, Chicago 21, Ill.

MIDWEST Drug Company offers you your own business, and future security—5441, Cleveland Ave., Columbus 11, Ohio.

FABULOUS Earnings—Fascinating pastime. Growing Genuine, living miniature (Ming) trees. New sensational Business or Hobby. Astounding information Free. Miniature Trees, Box 355, Briggs Station, Los Angeles 48, Calif.

COLORGLAZED Concrete Pottery made without molds. Patented method. Cemetery products, novelties, tiles. Basement leak-sealing. Money-making projects. Booklet, details free. Men only. National Potteries, Grand Rapids, "MINNESOTA"

YOUR own profitable home business. Preserve live flowers to last forever. Spare or full time. New discovery—simple—fascinating. No experience necessary. Send \$2.00 for working equipment, instructions and valuable sales plans. Satisfaction guaranteed or money refunded. Hermanseh, 210 Fifth Ave., Suite 1102, New York 10, N. Y.

WASTE cans, sawdust; insulates homes; saves 90% drawings, descriptions, \$1.00. Dowel Krafters, Route 2, Box 210-A, Hampton, Virginia.

MAKE Perfume—Men, women, write. Carey Laboratories, 1914 Chouteau PS7, St. Louis 7, Missouri.

NATURAL Molding Latex. Extra thick. Free sample. W. Wooley, 115-B, Donald, Peoria, Ill.

"HOW to build your own Mail Order business" Idea booklet for beginners. Mail Dealers tells how to use tested, workable, profitable plans. Send 25c and "Know How." Satisfaction guaranteed. Ludecke, 5809-A Franklin Ave., Hollywood, Calif.

MAKE Flexible molds! Cast plaques, figurines, bookends! Free sample! H. Tooker, 630-A Chestnut, Hamilton, Ohio.

PIDGEON—proof buildings. Amazing acceptance; details, formula guaranteed—dollar. Hodan, 305 1/2 4th St., Sioux City, Iowa.

MAGAZINES—Trade and Class—help you get ahead. Latest copies. Nearly 1200 covering every business, trade, profession, sport, hobby or other interest available through our Easy-to-Get-Acquainted Service. Particulars and price-list Free. Commercial Engraving Publishing Co., 348 North Ritter, Indianapolis 19, Indiana.

METALLIZE BABY SHOES. Repair Dolls. Make Rubber Stamps. Silver Mirrors. Make Beautiful Figurines. Catalogue of "30 Ideas" Free. Universal, Box 1076-B, Peoria, Illinois.

HOW Clubs Or Churches can Raise \$100 to \$6,000. Write to George Gabler, Forest Plaza, Ann Arbor Michigan.

\$46 FROM Square Foot Plywood; Jigsaw necessary. Write: Woodart, Bridgewater, Massachusetts.

ELECTROPLATE on non-metals. Instructions \$1.00. Four ampere plater \$19.95. Eight ampere \$29.95. 30 ampere \$85.00. Kissel Electric Products, 431 Sherman, Gallon, Ohio.

REAL money making opportunity making interlocking concrete building blocks. Rex Products Co., Dept. 21, Piqua, Ohio.

400% PROFIT manufacturing hand cleaners at home. Formulas free. Lume Products, 252 State, Batavia, N. Y.

NEW "Magic" Hand Cleaner. Fast seller-repeater. Money-maker! Free Sample. "Acro-Sol-Ex," 2438-D Fifteenth, Denver 11, Colorado.

MAILING postcards selling repeat merchandise is profitable. Everything supplied. Details free. Gordon Publishers, Box 23, Pawtucket, R. I.

LEARN Export-Import! Represent Manufacturers! Conduct barter-exchange without capital. Trade Bulletins, world trade directories supplied. Book Free! International Trade, 246-S, Fifth Ave., N. Y. 1.

GROW plants, flowers. Details free. Shiffer, Box 129, Millersburg, Penna.

\$250 WEEK Reported! Free illustrated book "505 Odd Successful Businesses." Work home! Expect something odd! Pacific-E, Oceanside, California.

HOW and where to obtain Capital? Free details. Star Service, Wapakoneta, Ohio.

FREE Details! "The Magic Formula for Mailorder Success." Mailord Company, 204-A7 East 81, New York 28, N. Y.

EARN Money At Home With Your Typewriter! Spare Time! Details free. Edwards, Publisher, 3915-PS, 12th, Des Moines 13, Iowa.

TRANSPARENT liquid rubber coating non-slip, speed drying; for floors, walls, woodwork, linoleum. Damp proof basements, 100% profit. Send \$1, introductory offer. Neco, 95 Liberty St., New York 6.

SAWDUST. Turn it into cash. Six methods. Instructions 25c. Charles Co., 12-BAZ, Norwood, Ohio.

MAIL Selling opportunities galore! Free! Wehner, Box 142-E1, Roxbury, Mass.

LEARN the profitable and fascinating art of Electroplating Baby Shoes at our expense! write for details to manufacturers of world's largest assortment all metal mounts, equipment and supplies. Dept. W2, Hollywood Bronze Supply, 1766-70 N. Vermont Ave., Hollywood 27, California.

QUICKER results from mailorder letters. literature written by Finkle-Advertising, 257-S South Spring, Los Angeles 12.

BOOKKEEPERS operate profitable "Bookkeeping Service." Details Free. Universal, Box 664-P, Springfield, Missouri.

BUY it wholesale. Manufacturers. Distributors. Over 850,000 items. Literature free. Olsen, 1231-B East Third St., Duluth 5, Minn.

BRONZED Baby Shoe Mountings, equipment and supplies. Buy wholesale from world's oldest and largest manufacturers of all metal mountings. Sales Dept., Hollywood Bronze Supply, 1766-70 N. Vermont Ave., Hollywood 27, California.

FREE Folio, 700 Money making deals. Plans, Formulas, Supply Sources. Kolamite Company, Box 572, Dayton 1, Ohio.

WATCHES. Elgin, Waltham, other outstanding brands. Expertly reconditioned, priced low for quick, great profits! Send for Free catalog. Plymouth Jewelry, 163P Canal St., New York 13, N. Y.

HOME maintenance, repair and improvement kinks wanted for new book. Good rates paid for original ideas, photographs; suitable amateur home handyman. Universal Publishing, 420 Lexington Ave., New York 17.

WANT a Home Business of your own? 24 page Idea Booklet Free. Maloy, 710 Melrose, Chicago 13 Illinois.

"BIG Profits—your own mail-order business. Small budget, 10c brings complete information. And years experience. Mathews, Dept. R-4, Lafayette Bldg., Philadelphia 6, Pa."

57 MONEY MAKING OPPORTUNITIES

DETECTIVES Earn Big Money. Experience unnecessary. Particulars free. Waggoner, P-125, West 86th, N. Y., N. Y.

SEWING Machine Home Setup. Our trained repair, sales and service men make big money first day. New Machines, motors, etc. furnished. Write Taylor Service Co., Hamilton, Ohio.

RAISE your business value, standing, as State Notary Public. Information, Stationers, Helotes 50, Texas.

A \$100-A-Month hobby at home! No soliciting, no mail order, no meeting people. Easy enjoyable pastime. Details, 25c (Refundable). Laura Dickson, 1006-PS Elizabeth Street, Anderson, S. C.

EARN money evenings, copying and duplicating comic cartoons for advertisers. Adservice, Argyle 2, Wisconsin.

\$250 WEEK Reported! Free illustrated book "505 Odd Successful Businesses." Work home! Expect something odd! Pacific-E, Oceanside, California.

DISTRIBUTE Sensational Songwriter Booklet, "Commercial Music." Ideal Home Mail-Order Business—Publication—Details—Discounts—\$1.00—Popular—Box 927—Atlanta, Georgia.

ADDRESS mail circulars for advertisers. Complete instructions—List of firms—25c Imperial, PS-7, Wilmington, N. Car.

58 FORMULAS, PLANS, ETC.

FORMULAS—All kinds. Latest products. Literature free. Kemico, Park Ridge 15, Ill.

10,000 FORMULAS and Trade Secrets. Free Literature. Stillmans, 555 Kingston Ave., Brooklyn 3, N. Y.

ANY formula or trade secret furnished. \$1.00. Richards, 424 N. Broadway, Baltimore 31, Maryland.

LABORATORY tested formulas. Lists free. Pont, Box 635-PS, Terre Haute, Ind.

59 PLASTICS

LUCITE. Plexiglas. Any size sheets, masked Square foot (12 x 12) cost 1/16", 96c; 1/8", \$1.25; 3/16", \$1.52; 1/4", \$1.80. Colors add 10%. Include 10% postage. Almac Plastics, 230 Fifth Avenue, New York 1, New York.

NEW Liquid plastic. Clear, colors. Cast without heat. Embed flowers, insects, coins, saw, drill, carve. Complete kit only \$3.95 postpaid, or send 25c for exciting new home project manual showing how to get started. Castolite, Dept. H-102, Woodstock, Illinois.

PLASTIC Sheets, Rods, Tubes, etc. Free List. Plastic Supply Co., 2901 N. Grand Blvd., St. Louis 7, Mo.

POPULAR SCIENCE OPPORTUNITIES

LUCITE, plexiglas, Acetate, 85 different colors, thicknesses. Immediate shipment from stock. Rod, Tube, casting plastic. Wholesale, retail. Catalog, instructions, bargain lists. 10c. Gem-O-Lite, Box 686Y, North Hollywood, Calif.

INTERNAL carved roses, orchids, swans, goldfish, butterflies, etc. Jewelry and gifts. Crystal Floral Novelty Co., Bound Brook, New Jersey.

INTERNAL Carving Drills 3/32" and 1/8" 75c each, three for \$2.00. Zona Sales, 8841 N. Central, Phoenix, Ariz.

INTERNAL Carvers—Plastic domes: Spherical-faced blanks—Free Price List. D. Niehaus, 6754 Vernon, University City, Missouri.

PLASTIC supplies, materials, instructions for hobby or business. Send for free catalog. Tells about internal carving. Hays Plastics, 1310 82nd Ave., Oakland, Calif.

60 CHEMICALS AND APPARATUS

NEW Idea Chemical and Apparatus Outfits for Home Experimenting. Photo-Scales, Microscopes, Chemicals, Biological and Laboratory Supplies in Small Quantities. Catalog 15c. Established 1931. John H. Winn, 124-B West 23rd Street, New York 20, N. Y.

LUMINOUS Paints will glow in dark. Six colors. Fairmount Chemical Co., 136 Liberty St., New York City 6.

COMBINATION OFFER—Chemical balance with weights, catalog of chemicals, apparatus, kits, \$1.00. Catalog only, 25c. Rex Laboratories, 2849-B Birchwood, Chicago 45, Illinois.

ILLUSTRATED Catalog: Chemistry, mineralogy, biology, 10c. Tracey Laboratories, Evanston, Illinois.

CHEMICALS and apparatus for industrial, analytical, and private laboratories. Catalog 15c. Dept. M-26, Biological Supply Co., 1176 Mt. Hope Ave., Rochester 20, N. Y.

61 HELP WANTED

INTERESTED in Latin American & Foreign Employment????? \$1.00 brings 1950 Copyrighted "Foreign Service Directory" World Wide Listings in Constructions; Oil, Mining; Aviation; Steamships; Manufacturers; Transportation; Exporters, Importers, Hot List Firms Hiring, How-When-Where to apply. Application form free. Global Reports, P. O. Box 883-S, Hollywood 28, Calif.

ALASKA—Last Great American Frontier. \$1.00 brings 1950 Copyrighted Directory & Government Map Free. Big Construction Projects; Fishing; Mining; Aviation; Hunting-Fishing-Game rules; Fur-Farming; Lumber; Live Stock; Agriculture, Homestead Land & Highway information. Listing firms hiring. Application form. Alaska Opportunist, P. O. Box 883-S, Hollywood 28, Calif.

FOREIGN Employment. Construction men, building trades, mechanics, helpers, office men. Good workers interested in Foreign Development Projects. Pipe lines, Dams, Power Plants, Roadways, Shipping, Oil refineries, etc. Transportation and quarters furnished; High wages. Listings of firms actively working on projects in Arabia, Persian Gulf, Africa, Alaska, Canada, South America, Europe, etc. Send \$1.00 for Foreign Construction Compendium and Application forms. Foreign Service Bureau, Dept. PS7 (Employment) P. O. Box 295, Metuchen, N. J.

\$1,000,000 CONSTRUCTION Job-Project Report. \$1.00 brings Monthly News Bulletin giving authentic projects starting "World Wide" USA; Alaska; Canada; Pacific; Arabia; Latin America; India; Mexico; Africa; Europe. Tells How-When-Where to apply. Global Reports, P. O. Box 883-PX, Hollywood 28, Calif.

62 AGENTS WANTED

AGENTS—300% profit selling genuine gold window letters; stores and offices. Free samples. Metallic Letter Co., 437 N. Clark, Chicago.

FAST profits—No investment. Send for big, free catalog. Plastic aprons, tablecloths, etc. 150 sure-fire items. We guarantee sales. Write The Halliday Company, Dept. P-6, 347 Broadway, Passaic, N. J.

COIN Machines, Punchboards. Free catalog. Tyrcha Wholesale, 4532 N. Meade Avenue, Chicago 30, Ill.

PHOTO-Salesmen-Agents. Sell beautiful hand-colored plastic enlargements. Collect deposit, we deliver. Profitable sideline. Send card for free sample kit. Novel Portrait Co., 3343-A North Ave., Chicago, Ill.

WHERE To Buy 800,000 articles direct from Manufacturers. Save by buying direct. Sent Free. "Your Profits Under the Spotlight." Glass Pub. Co., Ellwood City 3, Pennsylvania.

EXCELLENT Sideline for printing and advertising salesmen. Decalcomania name plates in small quantities. Great demand. Also, make money with our line of Automobile Initials and Sign Letters. Free Samples. "Ralco", XL-Roxbury, Boston 19, Mass.

IF You Sell, you need Opportunity Magazine—the "Salesman's Bible," packed with down-to-earth ideas that boost your earnings; filled with hundreds of announcements of new, fast selling items and lines. Send your name and tell us what you're selling now for Free copy of latest issue. No obligation. Opportunity, 28 E. Jackson, Dept. 31, Chicago 4, Ill.

CASH in on tremendous demand for new low priced burglar alarm for cars, homes and farm building. Nothing like it. Everybody wants one. 286% profit. Unique sample offer. Northwest Electric Co., Dept. P-20, Pukwana, S. Dak.

START Your Own Business on Credit. Always your own boss. 1554 Dealers, sold \$5,000 to \$26,500 in 1948; their average \$6,742. We supply stocks, equipment on credit. 200 home necessities. Sales experience not needed to start. Wonderful opportunity to own pleasant, profitable business backed by world-wide industry. Write Rawleigh Co., Dept. G-V-PSC, Freeport, Ill.

DRESSES 18c; Coats \$1.00; Blouses 35c; Free Catalog; Crown, 164-PB, Monroe St., New York 2.

BE Renewal Headquarters for all magazines. Handle everything at home. Big profits. No experience—no capital needed. Free catalog tells how. Write McGregor Magazine Agency, Dept. 510A, Mount Morris, Illinois.

GOOD Paying Business Silvering mirrors, plating autoparts, reflectors, bicycles, bathroom fixtures, etc., by late method. No tanks or shop required, outfit furnished. Free Booklet, Gunmetal Co., Ave. C, Decatur, Illinois.

FREE Outfit! Write today! Sell Embroidered Advertising Uniforms and Work Clothes, Initial Buckles, Belts, Badges, 2000 Emblems. Hookfast Co., Box 480PS, Roanoke, Virginia.

WRITE for free booklet and catalog telling how to earn substantial profits in your spare time by forwarding new and renewal subscriptions to all magazines for your friends and neighbors. Oldest U. S. Agency. Established 1869. Moore-Cottrell, North Cohocton, New York.

DRAW side income under Notary Public appointment. Stationers, Helotes 50, Texas.

GOLD lacquered Window Sign Letters. Large Sizes Penny Each. New foils. Absolutely Beautiful. Free Samples. Atlas, 544 W. 79th, Chicago 20.

JEWELRY For Salesmen Distributors Direct Factory. Catalog Free. Pickcraft (c 19) Bank St., Attleboro, Mass.

SHINE Shoes Without "Polish." New Invention. Lightning seller. Shoes gleam like mirror. Samples sent on trial. Kristee 151, Akron, Ohio.

\$50.00 EASILY made in spare time. Sell sensational new name-imprinted Christmas Cards. 50 sell for only \$1.00. Not obtainable elsewhere. Big Profit. Write for free samples. Kit on approval. Regal Greetings, Hazel Park 22, Michigan.

CALL ON FRIENDS with sensational Christmas Cards in handy assortments. Sell for \$1.00. Profit up to 50c. Also popular-priced Personal Christmas Cards. Everyday assortments. Stationery. Gift items. Samples on approval. Wallace Brown, Dept. L-4, New York 10, N. Y.

FREE SAMPLES. Big profits showing amazing Glow-in-the-Dark specialties House numbers, pictures, plastic novelties, ashtrays, keyholders, religious and nursery objects, etc. Madison Plastics, 303 Fourth Ave., New York 10, N. Y.

HAPPY money-making days for you! Sell friends Metallic Christmas Cards. Wrappings, Children's Books, Gifts, Novelties. Big profits. Bonus. Special offers. Request feature samples on approval, free samples Name Imprinted Christmas Cards. Stationery, Napkins, free Catalog and free Selling Guide, New England Art Publishers, North Abington 253, Mass.

AMBITIOUS, reliable men, women, wanted to End Refrigerator Defrosting nuisance for every housewife. Exclusive patented device. West made \$600.00 first three weeks spare time. That's exceptional. Pleasant, dignified. Write for free details. D-Frost-O-Matic, Dept. PSC-7, 6 N. Michigan, Chicago 2.

AMAZING offer—\$40 is yours for selling only 50 boxes Christmas cards. And this can be done in a single day. Free samples. Other leading boxes on approval. Many surprise items. No experience needed. Free samples personalized Christmas cards, stationery, napkins. Write today. It costs nothing to try. Cheerful Card Co., 1484 White Plains, N. Y.

MAKE Money Fast! Sell Christmas and Everyday cards to friends, neighbors, clubs, others. Amazing profits. Over 100 sell on sight items including 5 Leading 21 card \$1 assortments. Religious, 50 for \$1. Metallics, Comics, Stationery, Children's Books, Ladies' Rain Sandals, DeLuxe Personals, Bargain Offers, Extra Cash Bonus Plan. Write today for samples on approval. Hedenkamp, 361 Broadway, Dept. PS-7, N. Y.

AT LAST! Something new and sensational in Christmas cards. Show gorgeous satins, velours and metallics never before offered. Gets easy orders fast! Pays up to 100% cash profit. Free Samples of 30 Christmas cards with name, 50 for \$1.00 up, 80 Assortments, Personalized Book Matches and Stationery. Gift Items. 2 assortments on approval. Write Puro Co., 2801 Locust, Dept. 041-J, St. Louis, Mo.

BRAND NEW! Amazingly different and smart CHRISTMAS CARDS bring you big money! Take easy orders for sensational new Christmas Cards. Pays up to 100% cash profit. Christmas Cards With Name 50 for \$1. up, Big Line, Personal Stationery and Book Matches. Get sample assortments on approval. Imprints Free. Write today. North Star, 31 Glenwood, Dept. J-19, Minneapolis, Minn.

EXCEPTIONAL earnings selling famous Bostonian Shirts. Spare time, full time, sideline. Sales kit, actual fabrics, Free. Bostonian, 89 Bickford, Dept. A-11, Boston 30, Massachusetts.

SENSATIONAL nylons guaranteed against runs. Nationally advertised. Not sold in stores. No experience or money needed. Also lingerie, robes, men's hosiery. Outfit, sample, etc. free. Wonderful opportunity earn big money spare or full time. See our full page advertisement on page 31. Kendex Corporation, Babylon 249, N. Y.

FREE Samples, and amazing plan, giving you Gorgeous Dress without penny cost. Rush name today with dress size. Harford, Dept. C-135, Cincinnati 25, Ohio.

NEED extra dollars? Even beginners make profits to 100% selling new "Christmas Pearls". Metallics, Hankie assortments. Big line Novelties, Kiddies' Books, Wrappings, Bonus. Free sample portfolios. Name Imprinted Christmas Cards. Stationery—50 for \$1.00 up. Feature boxes on approval. Write Pilgrim Greetings, 111 Summer, Dept. AO-4, Boston, Mass.

AGENTS—make big money! Sell sensational new houseware items. Write for Free details, sales plan Today! Arrow Dept. 11, 1501 Broadway, N. Y. 18, N. Y.

IMAGINE—extra cash for you! Sell friends amazing value Metallic, Felt Applique, Comic, 50 for \$1.00 Christmas Cards. Exclusive Gift Wraps. All-Occasion Assortments. Scented Stationery. Animated Books, Gifts. Profits to 100%. Special offers. Bonus. Write today for free samples Name Imprinted Christmas Cards. Napkins, Stationery, Feature assortments on approval and free catalog. Elmira Greeting Card Co., C-2110, Elmira, N. Y.

ADVERTISING book matches—Cash in on big demand—sell Union Label matches. Cuts for all businesses and political parties—Free powerhouse selling kit—low prices—protection guaranteed on repeat orders—Cash commissions. Superior Match Co., Dept. P-250, 7536 Greenwood, Chicago.

POPULAR SCIENCE OPPORTUNITIES

AGENTS. Salesmen. Demonstrators. Distributors: For biggest profits, sell the "NuSilver, NuChrome, NuBrass, Plating Liquids," products. Cloth applied. Up to 900%. Get free sample offer NuSilver. 508-PS-7, NY Street, Aurora, Illinois.

SELL Big Money-Maker to men and Women. Easy handwork makes fast-selling useful articles. Sample free. Sunmade Company, Brockton 64, Mass.

INFORMATION—Wholesale supply sources. Moneymaking plans. Increase your income. Write Reynard Station, Smithfield 3, Ohio.

\$50 CASH! Sell America's Leading 21 Card Christmas Assortments. Samples on approval. New, Sensational Money-making Gift Items. Free samples 50 and 25 for \$1.00 Personal Christmas Cards. Write Lorain Art Studios, Dept. 52, Vermillion, Ohio.

GREETING card bargains. Personalized Napkins. Playing cards. Book Matches. Raum, 4154-b, Fifth Street, Philadelphia 40.

MEXICAN feather pictures. Big profits: no investment! Free details; sample 10c stamps. Silvia—SD Apartado 9036, Mexico City.

ANYONE can sell Hoover DuPont Nylon Uniforms for beauty shops, waitresses, doctors, nurses, others. In white and colors. Exclusive styles. Top quality. Low priced. Exceptional income. Real future. Equipment free. Write fully. Hoover, Dept. P-101, New York 11, N. Y.

DEALERS. Agents Wanted—Racing. Hot-rod. Speed equipment—Cams—Manifolds—Heads—Hollywood Mufflers—600 Specialties! Money-Making Kit. Catalog. Samples—50c. Almqvist Manufacturing, Milford 172, Pennsylvania.

NEW "Magic" Hand Cleaner. Fast seller-repeater. Money-maker! Free sample. "A-S-E," 2438-D Fifteenth, Denver 11, Colorado.

COSTS 4c—Sells Fast for \$1. Information Free. Pacific Sales, Box 1458B, Wenatchee, Washington.

\$50 YOURS sell only 100 boxes beautiful Xmas cards; also 50 & 25 for \$1 imprinted; others; novelties, metallics; stationery, write now for approval samples, cost nothing to try. Pen-'n Brush, PS-7, 139 Duane St., New York City 13.

BUY thousands of nationally advertised products direct from manufacturers and distributors. Write for "Buy Direct and Save." Service Publishing, 1420-B Investment Bldg., Pittsburgh 22, Pa.

MAKE Sensational Profits! 100 fast-selling, repeat Household Items! Literature free. Royalty. Box 748-B, Passaic, N. J.

POWER Mower—\$39.50. Delivered. Complete. Sales Kit—Free. Modern BF. Excelsior Springs, Missouri.

FLORIDA Health Food and Publishing Co., Orlando, Fla. wishes representatives. Catalog and samples free.

\$250 WEEK reported! Free illustrated book "505 Odd, Successful Businesses." Work home! Expect something odd! Pacific-E, Oceanside, California.

SELL America's only \$1.00 Gift wrap assortment containing 30 full size sheets: Giant plastic pencil containing personalized pencils; Santa stocking with name; Rudolph, the red nosed reindeer assortment. Over 100 Christmas card box assortments and surprise items. Write today for five—Free portfolios of personalized Christmas Cards. Elmercraft, Dept. 17, 5930 S. Western, Chicago 36.

PLASTONE—Amazing Auto Polish. New exclusive formula contains pure Carnauba plus genuine plastic. Nationally advertised. Sold by leading firms. Only \$1.00 retail! Free samples for your customers. Exceptionally high repeat sales. Choice protected territories. 100% profits. Opportunity for large steady earnings. Plastone Company, 2014-PS6, Wabasha Avenue, Chicago 47, Illinois.

SELL!! Balloons. Combs. Specialty Merchandise. Carleton House Distributors, Texas City, Texas.

MAKE \$50. Selling 100 boxes greeting cards, stationery, napkins, samples on approval. Plateless. 392 Broadway, N. Y. 13.

COMBINATION Weed Cutter-Power Mower. Sensation. Multicut, MC-2006. Excelsior Springs, Missouri.

1950 XMAS Card catalog ready! Earn more money as a wholesale jobber! Large selection of dollar box assortments. Imprints. Religious. Personalized Christmas Cards! Three dollar sample boxes \$1. Postpaid! Write for FREE Holiday Bulletin. Elfko, 438 North Wells, Chicago 10.

HOUSE Paint—Sell users and stores. Private label. Steady work. Big pay. Certified Products, Louisville, Ky.

\$1 STARTS you in business. Sell top quality \$1.00 ties. Now only \$7.20 dozen, your profit \$4.80 dozen. Regular \$1.50 up values. Send \$1.00 for Introductory Offer two ties. Catalog complete line free. Philip's Neckwear, 20 West 22nd St., Dept. P-42, New York 10.

COMMERCIAL Deep Frying Course. Mock Chicken Legs. Potatoes. New and proven methods. Learn about this money-making field. \$2.50, PP. Concession, Toledo 13, Ohio.

FREE Literature—Thousands Wholesale supply sources. Moneymaking Business ideas. Wilkin, Hillsboro 2, Ohio.

CANASTA Instruction book—new. latest ways to play—2 to 8 hands—easily learned—exciting! Past \$1 seller. Sample 50c! Troy Linotyping, Box 236, Troy, New York.

63 HIGHGRADE SALESMEN

BIG Money Taking Orders: Shirts, Ties, Sox, Pants, Jackets, Sweaters, Shoes, Uniforms, etc. Sales equipment free. Experience unnecessary. Nimrod, 4922-AV Lincoln, Chicago.

LOOK Here! Wanted—Men and women to start in business on credit. Sell some 200 farm-home Products. Thousands our Dealers now make quick sales, big profits. For particulars write Rawleigh's, Dept. G-192-PSC, Freeport, Illinois.

LONG NEEDED INVENTION. Every home, store, farm a prospect. Full or part time. Low price, long profit. Free outfit. Write Red Comet, Inc., Dept. 654, Littleton, Colorado.

WRITE 3 WORDS—Collect \$7.65 on 10-Second Demonstration to merchants—write on glass with Amazing Magic Crayon—Presto!—5 color advertising message takes fire—glows like brilliant Neon. Three sales daily bring \$22.95 profit. Rush postcard for details. Complete Sales Kit. Free! Maxilume Col. 125 W. Hubbard, Dept. CL-9, Chicago 10, Illinois.

SALESMEN—absolutely make \$50.00 a day. New sensational utility item for every food, beverage outlet, etc. Big Profits. Johnson-Hill, 53-BB West Jackson, Chicago 4, Illinois.

SELL New Automatic Floor Waxer. Trigger on Handle. Hands never touch Floors or Wax. Retail \$2.95. Profit 125%. Write Smith Inc., Greenfield 5, Mass.

SENSATIONAL Nylons guaranteed against runs. Nationally advertised. Not sold in stores. No experience or money needed. Also lingerie, robes, men's hosiery. Outfit, samples, etc. Free. Wonderful opportunity earn big money spare or full time. See our full page advertisement on page 31, Kendex Corporation, Babylon 249, N.Y.

SALESMEN—Put yourself in line for big money, real future. Keep stores supplied with 5c-10c to \$1 counter goods. Nationally advertised. Top profits for you and merchants. Liberal deals boost sales. Side-line or full time. World's Products, Dept. 83-J, Spencer, Ind.

SALESMEN calling on garages, gas stations. New \$16.98 item. Align-A-Matic, Box 94, W. Orange, N. J.

AD MATCHES! Sell Amazing Designs—20, 30, 40 and 240-light book matches. Big spot cash commissions; every business a prospect. Low prices for high quality. Repeats. Start without experience; men, women; full, part time. Buy Nothing! Sales kit furnished. Match Corp., Dept. PS-7, Chicago 32, Illinois.

67 EDUCATIONAL AND INSTRUCTION

USED Correspondence Courses and Books sold and rented. Money back guarantee. Catalog free. (Courses Bought). Lee Mountain, Pisgah, Alabama.

LEARN the Collection Agency business. Highly profitable. Easily mastered. Free folder. Cole Associates, Syracuse 2, N. Y.

BE A real estate broker through home study or classroom instruction. Write for free book. Approved for veterans. Weaver School of Real Estate, 15 E. Pershing Rd., Box PC-11, Kansas City 8, Mo.

BOOKKEEPERS! Increase your earnings! Operate your own simplified "Dollar-A-Week" Bookkeeping and Tax Service. Full or spare time. Details Free. No obligation. Ellis, Box 203, Cedar Grove, North Carolina.

AIRBRUSH Art. Learn this most modern of art techniques in your own home. New York School of Airbrush Art, 117-F E. 60 St., New York City. Approved as a Correspondence School under New York State Laws.

WANT a steady Big Pay Job in Diesel? Our approved, easy-to-understand Diesel Training Course qualifies you. Placement advisory service Free. Learn as you earn. Write for free 24 page book today! Interstate Training Service, Dept. 2N, Portland 13, Oregon.

LEARN Piano Tuning. Repairing—at home in 30 days. Unlimited income. Phonograph recordings, tools and instructions furnished. Write Capitol City Tuning School, Department C-733, 129 East Michigan, Lansing 16, Michigan.

PIANO Tuning Pays. Learn this profitable profession at home. Our Tonometer and mechanical aids make learning easy. No knowledge music necessary. Diploma granted. Largest and oldest school—51st year. G. I. Approved. Write for booklet. Niles Bryant School, 77 Bryant Bldg., Washington 16, D. C.

MAKE Up To \$35-\$45 Week as a Trained Practical Nurse! Learn quickly at home. Booklet free. Chicago School of Nursing, Dept. M-3, Chicago.

SELF-HYPNOSIS. Infallible method! \$1.00. Hampton, 3121 Hamilton Way, Los Angeles 26, California.

BECOME a Doctor of Psychology or Metaphysics. Teach secret of contentment, happiness. Win degree of PsD, or MsD. Solve mental worries. Free book. College of Universal Truth, 5153-K N. Clark, Chicago.

FREE—Bookkeeping lesson—Full Particulars. Buchalter, 110 West 42, New York 18, N. Y.

WELDING training pays. Catalog Free. GI Approved. Hobart Trade School, Box 279-P-703, Troy, Ohio.

MIND Asleep? Try "Thinking-Alpha-bet." Write Frank Tibolt, 17A, Phila. 20.

HOME Study Course. Chiro-Deo-Therapy. Drugless Healing Certificates. Diplomas. Degrees. Jacumba Hot Springs, Jacumba, California.

JOB Success guaranteed, send for occupational self-analysis form \$1.00. National Consultants, 100 Barr Bldg., Washington 6, D. C.

MEDICAL Laboratory Technicians in great demand. We train you in your own home. Catalogue free. Imperial Technical Institute, Box 973-B, Austin, Texas.

GET U. S. GOV'T JOB! Start high as \$66.34 week. Secure positions. Men—Women qualify Now. Many openings expected soon. Experience usually unnecessary. Free 40-page book shows jobs, salaries, sample tests. Write: Franklin Institute, Dept. G-22, Rochester, N. Y.

WE buy correspondence courses. Write Tom Harrison, 726 North Fifteenth, Waco, Texas.

REVOLUTIONARY conception of Public Bookkeeping! \$5.00 hourly. Simple instructions. Full, spare time. Systems, shortcuts, obtaining clients. Auditax, 10775-B, Tabor, Los Angeles 34.

LEARN Clock Repairing. All types illustrated manual \$1.00. Burney and Co., Box 287, Dayton 1, Ohio.

AMAZING new scientific way to remember. Free details. H. Kaye, P. O. Box 261, Staten Island 1, New York.

READ With Speed! New Amazing Method. Save hundreds of hours yearly. Free home test. No obligation. Rush postcard. Brownson, 9111 Hoyne, Chicago 20.

DRAFTING. Design. Mathematics. Building Estimating. Surveying. Engineer's License Preparation. Veterans accepted. Mondell Institute, 230 West 41st, New York.

POPULAR SCIENCE OPPORTUNITIES

DENTAL Technician's Manual. Authentic. Direct information. Write for free illustrations. Grant Laboratory, 219 W. 7th St., Los Angeles 14, Calif.

PHOTOGRAPHIC mind with Super-memory. write Thor Books, S-6, Box 1210, Chicago.

LEATHER Carving. Fascinating, highly-paid art; age-old secrets now taught by first time in home study course. For hobby, profession or profitable business. write: Baird School of Leather Carving, Dept. 27, Manitou Springs, Colo.

GRADUATE watchmakers! Reach an untapped source of profitable new business in chronograph watch repair. Easy step-by-step Esmbl-O-Graf method taught in GI-approved 22 week resident course or by low-cost home study plan. Be the first in your community to display the handsome Certified Chronograph Technicians' diploma. Complete information on request. Western Pennsylvania Horological Institute, Desk 39, 706 Smithfield Street, Pittsburgh 19, Pennsylvania.

IT'S later than you think! G.I. training will soon be over. Inquire about training for job opportunities to make your future secure. Don't risk losing your veteran's entitlement. Factual information free. Write W.P.H.I. Dept. PS, Chamber of Commerce Bldg., Pittsburgh 19, Penna.

68 DANCE INSTRUCTION

BE popular, conquer "Danceritis" (fear of dancing). Free trial lesson. Castle Studio, 35-W, Warren, Youngstown 7, Ohio.

69 CONTESTS

PRIZE Contests present amazing money-making opportunities. Only 10c. National Contest Bulletin, Box 2685-C, Miami 16, Fla.

72 AUTHORS SERVICE

MAKE Extra Money rewriting ideas in newspapers, magazines, books. Receive checks for \$3 to \$100, offered daily. No previous experience necessary. Write for Free details and how to get Free Writer's Market Guide! Comfort Writer's Service, Dept. 7-J, 200 S. 7th St., St. Louis, Mo.

73 BUSINESS SERVICE

WHERE to buy it information, almost anything. Write, listing items, Kelly, 9544-C Whitecomb, Detroit 27, Michigan.

CHICAGO Mail Address, Confidential. Receiving, Forwarding, Faultless, M-3439 Michigan, Chicago 16.

74 CARTOONING, SIGN PAINTING, DRAWING AIDS

CARTOON Your Way To Success! Internationally known instructor, Raye Burns, will personally teach you to create salable, original cartoons at home. Course of 26 lessons only \$2.85. Send remittance with order or write for Free Details and addresses of successful students, Raye Burns School, Box 3583-S, Cleveland 18, Ohio.

"HOW TO MAKE MONEY WITH SIMPLE CARTOONS"—A book everyone who likes to draw should have. It is free; no obligation. Simply address Cartoonists' Exchange, Dept. 197-C, Pleasant Hill, Ohio.

SIGN painting taught at home. Test lesson free. Ben Kerns, Box 812-PS, Greenville, S. C.

BECOME an Artist! Learn Cartooning, Commercial Art, Lettering, Showcard Writing, Photo Coloring, etc., quickly with our New, Easy Methods, Catalog Free, National Artists, Box 4248-C, Dallas 8, Texas.

75 CHALK TALK-STUNTS

CHALK Talks. Laugh Producing Program, \$1.00. Illustrated Catalog 10c. Cartoonist Balda, Oshkosh, Wisconsin

76 TYPEWRITERS AND OFFICE MACHINES

PRINTOMATIC selffeeding Post Card printing Duplicator \$13.50. Envelope Addressing Machines \$24.50. Pittsburgh Typewriter Company, 336-G Fourth Avenue, Pittsburgh 22, Pa.

77 OFFICE SUPPLIES & EQUIPMENT

REVOLUTIONARY Portable Addresser. No Plates! New. Sensational!!! Only \$9.95 Complete!!! Fully Guaranteed. Prub-Ex, Kingsport, Tennessee.

TYPEWRITERS (used) \$17.50: New portable Typewriter \$59.50. Duplicators \$11.00. Adders \$14.00. Addressers \$12.50. Delivered anywhere in U. S.; Typewriters, 118N Spruce, Wichita, Kansas.

79 PRINTING OUTFITS, SUPPLIES

"PRINTING presses, type, supplies. Send dime for complete illustrated printer's supply book, details and press samples. Kelsey, Inc., J8, Meriden, Connecticut."

PRINTING Presses, Type Supplies, Lists 3c. Turnbaugh Service, Loysville, Penna.

MAKE your own rubber printing cuts Self-molding process, Plexirubber, Arkyle 2, Wisconsin.

80 PRINTING, MULTIGRAPHING, ETC.

500 LETTERHEADS or envelopes \$2.95 postpaid. Odom Supply, Box 9345, Tampa, Florida.

1000 BUSINESS Cards \$2.50 Prepaid samples Free. Reliable Print Shop, 905 East Jefferson, Louisville 6, Ky.

500 3/4 x 2 1/4 PRINTED Stickers 50c. General printing, Willis Myers Company, Owosso, Michigan.

BUSINESS Stationery, Samples, Prices Free, Howprint, 717-23 Eunice, Webster Groves 19, Missouri.

ATTRACTIVELY Embossed Business Cards, 1000; \$3.50. Samples, Midwest Embossing, Box 999A, Wichita 1, Kansas.

500 ATTRACTIVE 2 Color Business Cards or Envelopes \$3.25. Samples, Mail Press Dept. K, 2234 Charlestown, Toledo 13, O.

82 PATENT ATTORNEYS

C. A. Snow & Co.—S-427, Snow Building, Washington 1, D. C. Registered Patent Attorneys. Write for information.

INVENTORS. For "Record of Invention" form, contact Carl Miller, Registered Patent Attorney, Woolworth Building, New York.

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent, John N. Randolph, Registered Patent Attorney, 207 Columbia Bldg., Washington 1, D. C.

INVENTORS: When you are satisfied that you have invented something of value write me, without obligation, for information as to what steps you should take to secure a Patent. Write Patrick D. Beavers (Formerly Randolph & Beavers) Registered Patent Atty., 938 Columbia Bldg., Washington 1, D. C.

INVENTOR'S Guide free on request. Frank Ledermann, Registered Patent Attorney, 154 Nassau St., New York 7.

INVENTORS: Write for free brochure "Evidence of Invention." Labiner, World Building, New York 7.

PATENT practice before U. S. Patent Office. Validity and infringement investigations and opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommel, Registered Patent Attorneys, Suite 413, 815-15th St. N.W., Washington 5, D. C.

INVENTORS: Learn how to protect your invention. Unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and prepared to serve you in handling your patent matters. "Patent Guide for the Inventor" containing detailed information concerning patent protection and procedure with "Record of Invention" form will be forwarded to you upon request—without obligation. Clarence A. O'Brien & Harvey Jacobson, Registered Patent Attorneys, 62B-D, District National Building, Washington, D. C.

INVENTORS—If you consider your invention to be something of importance, take steps to protect it with a United States Patent which gives you the right to exclude others from making, using and selling your invention as claimed. "Patent Protection for Inventors" outlines steps to take to secure patent protection. Mailed promptly without obligation. Victor J. Evans & Co., Merlin M. Evans, Registered Patent Attorney, 541-H, Merlin Building, Washington 6, D. C.

INVENTORS—If you believe you have an invention, we can make a preliminary search on your invention and advise you whether we think it can be patented. Send for copy of our Patent Booklet "How to Protect Your Invention" and "Invention Record" form. No obligation. McMorro, Berman & Davidson, Registered Patent Attorneys, 1432 Victor Building, Washington 1, D. C.

PATENTS—Trade marks, Irving L. McCathran, 316 McLachlen Bldg., Washington 1, D. C. Registered Patent Attorney.

REGISTERED Patent Attorney offers services. Sanders, 6430 Evans, Chicago 37, Illinois.

83 FOR INVENTORS

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent on your invention. John N. Randolph, Registered Patent Attorney, 206 Columbia Bldg., Washington 1, D. C.

CASH For your idea, 280 manufacturers need inventions, patented or unpatented. List free. Invention Bureau, 208-S Clinton, Oak Park, Illinois.

INVENTORS: The usual First Step is to have a search of the U.S. Patents conducted, so I can report on Patentability. Write, without obligation, Patrick D. Beavers (Formerly Randolph & Beavers) Registered Patent Atty., 939 Columbia Bldg., Washington (1), D. C.

INVENTORS: If you have an invention for sale, patented or unpatented, write Institute of American Inventors, Dept. 30A, 631-E St., N.W., Washington 6, D. C.

"INVENTOR'S Guide" free on request. Frank Ledermann, Registered Patent Attorney, 154 Nassau St., New York 7.

INVENTORS. For "Record of Invention" form, contact Carl Miller, Registered Patent Attorney, Woolworth Building, New York.

SUCCESS Guaranteed. Inventors with patented and patent pending inventions for sale or lease, request our free book. No obligation. Dept. 2-F, Universal Marketing Co., 354 South Spring St. Los Angeles 13, Calif.

INVENTORS: Learn how to protect your invention. Unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and prepared to serve you in handling your patent matters. "Patent Guide for the Inventor" containing detailed information concerning patent protection and procedure with "Record of Invention" form will be forwarded to you upon request—without obligation. Clarence A. O'Brien & Harvey Jacobson, Registered Patent Attorneys, 62A-D District National Building, Washington, D. C.

INVENTORS—Send today for booklet "Patent Protection for Inventors" giving detailed patent information and preliminary steps to take toward patent protection, also "Evidence of Invention" form. Victor J. Evans & Co., 542-H Merlin Building, Washington 6, D. C.

PATENT Searches \$5.00. Including patented copies. Reliable and accurate reports. Free protection forms, 48 hour service. Patent Service Institute, 945 Pennsylvania Avenue, Washington 4, D. C.

INVENTORS—Protect your invention by a U. S. Patent. Write me for free record of invention form. Sherman Levy 620 Victor Building, 724-9th Street, Washington 1, D. C.

INVENTORS—If you believe you have an invention, we can make a preliminary search on your invention and advise you whether we think it can be patented. Send for copy of our Patent Booklet "How to Protect Your Invention" and "Invention Record" form. No obligation. McMorro, Berman & Davidson, Registered Patent Attorneys, 1431 Victor Building, Washington 1, D. C.

COMPREHENSIVE inventors services by patent research organization: Patent searches, patent drawings, patent applications prepared invention marketing, protection forms free. Industrial Patent Reports, Box 1081, Massachusetts and North Capitol, Washington 13, D. C.

POPULAR SCIENCE OPPORTUNITIES

I. F. I. Creative Co-operation includes: Superscope patent searches; commercial prospects analysis; pre-patent priority protection; invention-improving; finding backers; invention-styling for sales-leadership, plus the Promoting, Marketing, and Selling of inventions for Maximum Cash and Royalties. Write today for free information. Inventors-for-Industry Inc., P.S. 6, Suite 501, 1947 Broadway, New York 23.

"THRILLING Sensational, Cuban-Mexican Art" Pictures, Books, Miscellaneous, samples, lists, \$1.00-\$2.00. Jordanart, Box 1265-P, Boston 4, Mass.

INVENTORS: Obtain patents without assistance. Details free. International Patent Library, 1420 New York Avenue, Washington 5, D. C.

PATENT Searches by former Patent Office Examiners \$5.00. Protection forms free. Write Patent Examiners, 734 15th Street, N.W., Washington 5, D. C.

84 INVENTIONS WANTED

CASH For your idea. 260 manufacturers need inventions, patented or unpatented. List free. Invention Bureau, 208-S Clinton, Oak Park, Illinois.

INVENTIONS Promoted, Patented or Unpatented. Write Adam Fisher Company, 183-A Enright, St. Louis, Mo.

INVENTORS: Hundreds of manufacturers have requested our assistance in locating marketable new products. Complete information, free. Institute of American Inventors, Dept. 30C, 631-E Street, N.W., Washington 4, D. C.

INVENTORS—What have you, patented, patent pending to offer manufacturers? Booklet, information free. Market Contacting & Data Service, 11106-B3 Longwood, Chicago 43.

HIGHEST royalties—cash. Patented and patent pending inventions only. Request our free book. No obligation. Dept. 2W, Universal Marketing Co., 354 South Spring St., Los Angeles 13, Calif.

INVENTIONS Wanted. Patented or Pending only. Inventors Exchange-D, Hartford 1, Conn.

INVENTORS Marketing Assistance. Circular Free. Stanley Hull, 7829-P Euclid, Cleveland 3, Ohio.

INVENTORS—our clients are asking for new devices for manufacture and sale. Write Visioneering Inc., Security Bldg., West Bend, Wis.

AUTOMOTIVE Items patented or pending wanted on royalty basis. Deal direct. We manufacture and distribute in the automotive field. Write Dept. PS, Furman Co., Inc., 41 E. 28th Street, New York 16, N. Y.

85 PATENTS

INVENTORS: Test the commercial value of your patented or unpatented inventions, quickly and inexpensively. Write for free information. Institute of American Inventors, Dept. 30-B, 631-E St., N. W., Washington 6, D. C.

THE U. S. Patent System does not compel inventors into rash "Patent (S)pending." The intent of the Patent Law is to give you the chance of making a Pre-patent test of the worth of your ideas. And high-character Priority Protection for this purpose can be obtained through: Inventors-For-Industry Inc., Dept. P.S. 6, Suite 501, 1947 Broadway, New York 23. Write today for free information.

86 PATENTS FOR SALE

PATENT Pending Inventions: Farm, household, Sport, Toy, Hardware Items. Royalty. Leo H. Wirsig, Deepwater, Mo.

88 MANUFACTURING

FOR sale, complete dies and patterns to make a penny vending machine. Sample \$10. Al Hoff, 1920 Rose, Baltimore 13, Md.

89 MODELS, MODEL SUPPLIES

BUILD Historic Ship models, complete kits 39c to \$9.00. Catalog 10c. Ideal Models, 21 West 18th, New York 11, N. Y.

SHIP Model and yacht supplies, complete large 64 page catalogue, 30c. Wm. Wild, 510 E. 11th St., New York City.

SHIP and Yacht model fittings; blueprints. Send 25c for illustrated catalog No. 25—Listing hundreds of items. A. J. Fisher, 1002-2 Etowah, Royal Oak, Mich.

MINIATURE engines, castings and drawings. Catalog world's largest selection 25c. Miniature Engine Laboratories, 200-B Cement Ave., Sandusky, Ohio.

SHIP Models—most complete line in New England. Kits, parts, plans, books. Steam and electric power plants. Illustrated catalog 25c. James Bliss & Co., Inc., 220 State St., Boston, Mass.

POWER models. Unusual steam gasoline and traction engines. Metals, tools, accessories. New catalog 50c. Charles Cole, Ventura, California.

STEAM engines, boilers, castings. Catalog 25c. Anton Bohaboy, 2297 Price, Rahway, New Jersey.

READY! Our 1950 catalog of ship model kits and fittings; sail, steam, diesel. Send 25c for catalog. Model Shipways, Folio 41, 476 Main St., Fort Lee, N. J.

91 HOME CRAFTSMEN

TURN your spare time into cash. Make quick-selling, highly profitable lamps—every home a prospect. No experience or special tools required. New 1950 56-page illustrated catalog shows shades, shade frames, figurines and bases, oil lamp converters, boring compounds, and dozens of similar items. Also all kinds of sockets, cords, pipes, harps, finials, bases, and hundreds of other parts—everything you need. Special 8-page section shows 6 beautiful lamps in kit form ready to assemble. You buy wholesale, sell at retail—make big profits. Hundreds doing it. You can, too. Send 25c today for catalog and wholesale price list. Refundable first order. Gearon Co., Dept. 500-A-7, 27 S. Desplaines, Chicago 6, Illinois.

PROFIT with Larson Leathercraft. Belts, purses, 100 other ideas. Largest supply in U. S. Catalog 10c. Larson, Dept. C, 826 S. Tripp, Chicago 24.

NEW 96 PAGE Leather and Craft catalog, 1000's of items. Send 10c. Russo Handicraft Supplies, Dept. 7H, 245 South Spring, Los Angeles, California.

JIGSAW Owners attention! Start earning money at home cutting out wooden novelties and souvenirs. Write H. Cook, 4407 S. Normal Ave., Chicago 9, Ill.

HOME sewers wanted—Illustrated folders, 10c. Baby-Gay, Beaver Dam 3, Wis.

LEATHERCRAFT Supplies. Leather & Tools, low prices. Send 10c for catalog. Jonas Handicraft Co., Dept. P-6, 30 Frankfort St., New York 7.

LEATHERCRAFT. Copper tooling. Textile painting. Make spare time, profitable time! Free illustrated catalog shows everything you need. Kit Kraft, 7377 Melrose, Hollywood 46, California.

8 BEAUTIFUL Full Size Whatnot patterns 25c. Joanness, P. O. Box 141-S, Omaha 7, Nebraska.

KNOCKDOWN Cedar Chest, Lumber and Veneers. Free Price List. Giles Co., Brownsboro, Alabama.

89 FULL size Jig Saw patterns of beautiful shelves, ornaments, toys, novelties. Plus "How, Where to Sell". Only \$1.00. Mastercraft 74S, 7041 Olcott, Chicago 31, Ill.

16 NEW lawn chairs, 22 picnic tables, benches, trellises etc. All 38 plans with necessary full size patterns, \$1.00. Mastercraft 73S, 7041 Olcott, Chicago 31, Illinois.

90 ALL new, full size lawn ornament and novelty patterns, up to 20" high. Only \$1.00. Mastercraft 72S, 7041 Olcott, Chicago 31, Illinois.

MICALITE Sign Letters! Reflect Light! Sample 25c. Harwell, Byrdstown, Tenn.

"NEW invention saves paint. Prevents dripping, messy cans. Speeds painting time. Send 25c for patented device. Thomas Office Equipment, Bay City, Michigan."

80 FULL sized patterns, toys, novelties, lawn ornaments, \$1.00. Modern Woodcraft, Saginaw, Mich.

BRASS and Copper Materials, 24 page catalog 10 cents. Groundmaster Company, Div. B, Boulder, Colorado.

92 BLUEPRINTS AND PLANS

HOME Freezer Plans \$3.00. 178 other Farm, Home Devices. Built from salvage materials. Handbook 25c (Refundable). Free Literature. Kimo, Box 307-PS, New York 19.

93 BUILD IT YOURSELF

BUILD Your Own "Tractor". Plans. Walking, riding. Write Eltraco D-5, Camp-tonville, California.

MOTORIZED your lawnmower. Send 25c for easy plans. Describe your mower. Lutts, Box 211-PS, Ontario, Calif.

"CONCRETE Block Homes." 32 page booklet on how to build, \$1.00. Other Home Building booklets, \$1.00. H. C. Lightfoot, Civil Engineer, Richboro, Penna.

BUILD inexpensive concrete blockmaker. Motor—hand. Make block per minute. Write, Clyde Lee, Mountain View 1, Okla.

MAKE your own battery charger for a few cents, complete instructions one dollar. Vaughan, Box 341, Columbia, S. C.

STREAMLINED. Built-in Kitchen cabinets to fit any kitchen. Illustrated manual describes designing and construction. All for \$1.00. Thombert Company, Newton 11, Iowa.

50% COMMISSION steady repeat orders, lifetime income, free outfit. Nichols Company, Dept. C-902, Purvis, Miss.

\$600. BUILDS Cozy 4 rooms and Bath. Concrete Block, stuccoed, instructions & Blueprint \$1.00. Farrow, G-82, Box 645, Columbus 16, Ohio.

BUILD Your Own "Lawn Mower." Brush cutter, Small timber saw, Plans, Kits, Completed. Write Eltraco D-55, Camp-tonville, California.

94 WATCH REPAIRING

WATCHMAKERS' Journal contains helpful hints on watch repairing. Sample copy 20c. Dean Co., 116-B Nassau St., New York 7, N. Y.

10 SWISS Wrist Watches needing some repairs \$15.00. 10 Watch Movements for practice work \$5.00. B. Lowe, Holland Bldg., St. Louis 1, Missouri.

WATCHMAKERS' Tools, Materials. Sold—Bought. Catalogue! Bengal Company, Culver City, California.

95 OLD GOLD, WATCHES, ETC.

HIGHEST Cash Paid For old, Broken Jewelry, Gold Teeth, Watches, Silverware, Diamonds, Spectacles, Platinum. Free information, Satisfaction Guaranteed. Government Licensed, Ross Smelting Company, 29-Y East Madison, Chicago.

HIGHEST Prices Paid for old gold, silver, platinum, diamonds, watches, gold teeth, spectacles, Cash immediately. Goods returned if offer unsatisfactory. Government Licensed, United Smelting Works, (The Old Reliable), 39-A South State, Chicago 3.

96 JEWELRY

JEWELRY Making. Illustrated catalog 20c. George Sassen, 35 Maiden Lane, N. Y. C. 7.

100 MISCELLANEOUS

BOOKFINDERS! (Scarce, out-of-print, unusual books) Quickly supplied. Send wants. Clifton, Box 1377-PSM, Beverly Hills, Calif.

CLIPIT—Don't use rubber bands for storage, get Film clips for movie film reels. Clips edge of reel and holds film through perforations. Simple to attach and detach. Send 25c for six. Madison Products Co., Toledo 2, Ohio.

POPULAR SCIENCE OPPORTUNITIES

DRESSES 18c; Coats \$1.00; Blouses 35c. Free Catalog. Crown, 164-PC Monroe St., N. Y. 2.

REFRIGERATOR rubber door seals. Rues Trading 6013G-13th, Brooklyn 19, New York.

FAMOUS letterwriter criticizes letters \$1. Author "The Master Letter Writer" 144, Westport, Conn.

AGATES from Pacific Ocean, highly polished 2 for \$1.00. Postpaid, Smith's Agate Shop, 228 S. W. Alder, Portland 4, Oregon.

"INTERESTING Mails"—25c will keep your mail box full three months. Bentz, Jr., Desk B-53, Ghatawa, Mississippi.

LEATHER tools, lacing, supplies. Free Catalog. National Handicraft, 199 William St., New York 7.

PORTABLE Cutting Outfits... Terrific buy for hobbyists, welding shops, rescue squads, etc. Regularly \$159.00 New Portable Oxygen-Acetylene cutting outfits, reduced to \$89.50. Contains: cylinders, torch, regulators, complete outfit. Also available with welding torch and tips for little extra! Send for free descriptive folder. Dealer inquiries invited. Industrial Air Products Co., 3200 N.W. Yeon Ave., Portland 11, Ore.

IF you are nervous, write The Herbmater, Forestville 8, Virginia.

220 PAGE Marine Hardware catalog beautifully illustrated for \$1.00. Money refunded with first order plus 10% discount. Marine Products, 7 Longfellow St., Baldwin, L. I., N. Y.

TREASURE—Mineral Locators—Geiger Counters can be purchased on monthly payment plan. Free literature. Fisher Research Lab., Inc., Palo Alto, Calif.

A Thousand laughs. Unique jackass cigarette dispenser. Holds 10 cigarettes. Simply press donkey's head down, tail rises, presto, out slips cigarette. Satisfaction guaranteed. Sent postpaid for \$1.00 with order or \$1.20 C.O.D. Sanimo Industries, Dept. PS-16, Spencer, Indiana.

"OPPORTUNITIES Galore"—interesting profitable mailing, 10c. Valles, Box 242-CG, Brooklyn 1, New York.

BIG Mails Three Month, 25c, year Name Listed Directory \$1.00. Harvey Teeple, Decatur, Indiana.

PANNING Gold Beginners booklet 36 pages. Catalogue—Supplies, Mining Books, Maps, "Where To Go" 25c. Old Prospector, B-316, Dutch Flat, Calif.

"LIQUID Lead". Bonds practically any metal, including aluminum. Works cold. Makes lead molds. Hundreds other uses. Amazing product that is needed in every home and shop. Trial kit \$1.00 postpaid. ANTI-oxidizing soldering flux for aluminum and other difficult soldering, such as cracked blocks and castings, tinning welds, etc. Two ounces \$1.00 postpaid. Both for \$1.85 postpaid. Critcher Specialty, 731-B W. Euclid, Detroit 2, Michigan.

GOLDEN Syrian Hamsters. Better breeding stock at lower prices. Send \$3.00 for selected pair or write for information and price list. Lakeview Hamster Colony, Newfield, New Jersey.

NOVELTIES for Men. Unique Novelty and Catalog 25c. Novelart—PS. Laurens, S. C.

HOUSEHOLD needs, jewelry, gifts. Nearly Wholesale savings. Free Catalog includes easy \$500 Free Prize Contest. Write Fradkin Bros., Dept. 10, Sparrows Point 19, Maryland.

101 FOR SALE—MISCELLANEOUS

FLAP or cord stock. Send for our special price list on U. S. Koylon Foam Rubber in bulk. Re-upholster seats, furniture, autos, etc. A.M.C. Supply Co., P.O. Box 1440B, Fort Worth, Texas.

FREE catalog! Save money. Surplus clothing bargains. N. Y. Clothing Co., N. Y. 29.

16MM CINE Kodak Magazine Camera. F/1:9, case, immaculate, \$99.50. Write for catalog of outstanding photographic values. Empire Camera Exchange, Dept. PS-7 74 E. Post Rd., White Plains, N. Y.

102 WANTED MISCELLANEOUS

SCRAP Mercury (Quicksilver) Tantalum—Bismuth—Tungsten. Metallurgical Products Co. Established 1909, 35th & Moore Sts., Philadelphia 45, Pa.

WANTED: Miniature Steam Engine Plant about 1/20 to 1/5 horsepower. National Scientific Laboratories, Inc., 2010 Massachusetts Avenue N.W., Washington 6, D. C.

103 FOR THE HOME

OUTDOOR Toilets, Cesspools, Septic Tanks cleaned, deodorized with amazing new product. Just mix dry powder with water; pour into toilet. Safe, no poisons. Save digging and pumping costs. Postcard brings free details. Burson Laboratories, Dept. V-39, 955 Willard St., Chicago 22, Ill.

104 PERSONAL

DETECTIVE'S Opportunities. Particulars free. Write, Wagoner, P-125 West 86th, New York 24.

"HOW Can I Find Out?" You Can! Information discreetly developed. Any matter, person, problem, anywhere. Worldwide. Officially licensed, bonded service. Established 1922. Reasonable. Confidential. William Herman, 170 Broadway, New York.

BORROW by mail. Loans \$50 to \$300 to employed men and women. Easy, quick. Completely confidential. No endorsers. Repay in convenient monthly payments. Details free in plain envelope. Give occupation. State Finance Co., 210 State Finance Bldg., Dept. K-14, Des Moines 9, Iowa.

PSORIASIS SUFFERERS: Has everything failed to bring even temporary relief from scales, lesions and itching? Then write today for FREE important information. You needn't invest one cent! Pixacol Company, Box 3583-S, Cleveland, Ohio.

ATHLETE'S Foot! Ringworm! Amazing New Preparation (DermOring). Sure remedy with one application. Money back guarantee. Send \$1.00 includes postage. Candido Pharmacy, Box P-1256, Albany, New York.

WANT Mail? Send \$1.00 F. Lee, 445 Conkey, Hammond, Indiana.

FEET torture you? Itch? Crack? Sweat? Use powerful U. S. surplus foot powder. 3 Army-size cans \$1. Battle-tested! Guaranteed! Anderson Co., 208 East 58 St., Brooklyn 3, New York.

INFORMATION for single people by Human Relations Consultant, Dr. B. Long, Box 375, Los Angeles 53, Calif.

BETTER Eyesight through simple exercises. Complete instructions \$1.00. Richards-Ravaioli, Box 652, McAlester, Okla.

HYPNOTISM. Self-hypnosis courses. Free details. Craft Publications W2, 601 S. Vermont, Los Angeles 5, Calif.

MEXICAN Law. General Practice Attorney, 1203 Arizona Street, El Paso, Texas.

VALUABLE Big Mails, four months listing 25c. Wright Publications, Memphis 8, Tennessee.

PASSIONATE Love Letters. Complete collection, 25c (coin). Box 28, Bronx 67, N. Y.

106 ADVERTISING

AVOID costly advertising mistakes. Get enlightening Ad-Guide and Ratebook leading newspapers, magazines, mailing lists, 10c. Chicago Advertising Agency (Established 1900), Chicago 4.

24 WORDS in 50 Weeklies, \$4.96. H. J. Darnell, 730 Hays, Jackson, Tennessee.

ADVERTISE: 24 words, 40 Newspapers, \$3.50. Lists Free. Advertising Bureau, 10511-P Springfield, Chicago 43.

ADVERTISE in 40 weeklies, 24 words, \$3.50. Pennnebaker Advertising, San Marcos, Texas.

115 DRAWING & ART SUPPLIES

DRAFTING and artists' materials catalog—thousands of items—25c (deductible first \$2 order). Gordon's, 219 Madison, Chicago.

117 TATTOOING SUPPLIES

TATTOOING Outfits, Supplies, Illustrated List Free. Zeiss, 728 Lesley, Rockford, Illinois

120 CANDY MAKING

LEARN Professional candy making profitable home business. Details 10c. Pate, Kissimmee 2, Florida.

MEN-WOMEN—"Everybody Likes Candy." Learn to make professionally. (Our 40th year.) Ragsdale Candies, East Orange, New Jersey.

122 GARDENING

GIANT Cultivated Blueberries—4—Bear-ing Age plants, 18"—24"—\$3.25. William Volk, Browns Mills, New Jersey.

126 CAMPING

MOUNTAIN tent, Genuine USA; nylon, new, \$24.95, p.p. 75c. Free camping catalogue, Morsan, 10-19Q 50th Ave., Long Island City 1, N. Y.

128 HUNTING

"TIMBER wolf skins (tanned) up to 8 feet from \$10.00 duty free; also bear—black—brown—grizzly—polar. Munro—Comox—British Columbia.

131 TREASURE FINDERS

TREASURE Hunters! New 11-pound featherweight Model 101 locator for gold, silver and minerals. Money-back guarantee best available. Also Geiger Counters for uranium prospectors. Complete information free. The Goldak Company, 1540 W. Glenoaks Blvd., Glendale 1, Calif.

METAL Detectors. The very latest circuit. Send 25c for literature. Hedden Metal Detectors, 3329 Liberty Ave., Pittsburgh 1, Pa.

SENSATIONAL new line of Geiger Counters for Uranium detection. All types, all prices. No finer selection. Also Mineral-ights and new gold, silver and mineral Detectors. Complete information Free. Detectron Co., 5631 Cahuenga, Dept. A-7, North Hollywood, California.

TREASURE—Mineral Locators—Geiger Counters M-Scope Type. Lightweight. Unsurpassed in efficiency. Factory guarantee. Lowest prices. Can be purchased on monthly payment plan. Free Literature. Fisher Research Lab., Inc., Palo Alto, Calif.

"GEIGER Counter Model C-18, fits coat pocket, 2 pounds weight, ultra sensitive, dependable, immediate shipment, only \$35.00. Fisher Research Lab., Inc., Palo Alto, Calif."

137 DETECTIVES

DETECTIVE Training. Phillips Secret Service System, 1917-C North Kenneth, Chicago 39.

DETECTIVES—Work home—Travel. Experience unnecessary. Write Wagoner P-125 West 86th, N. Y., N. Y.

DETECTIVE—Investigator courses, FREE literature. Allied Academy, 14 No. East, Indianapolis, Indiana.

140 HAIR PREPARATIONS

DANDRUFF? Itch? Hair Loss? Then send \$1.00 bill today for real scalp treatment formula. Gets results. S. Viggiano, Pharmacist, 6556 Ladson, Pittsburgh 6, Pa.

142 INFORMATION

AMATEURS—Radio and Electrical Research Engineering. H. Y. Twilimann, R. R. #1, Chesterfield, Mo.

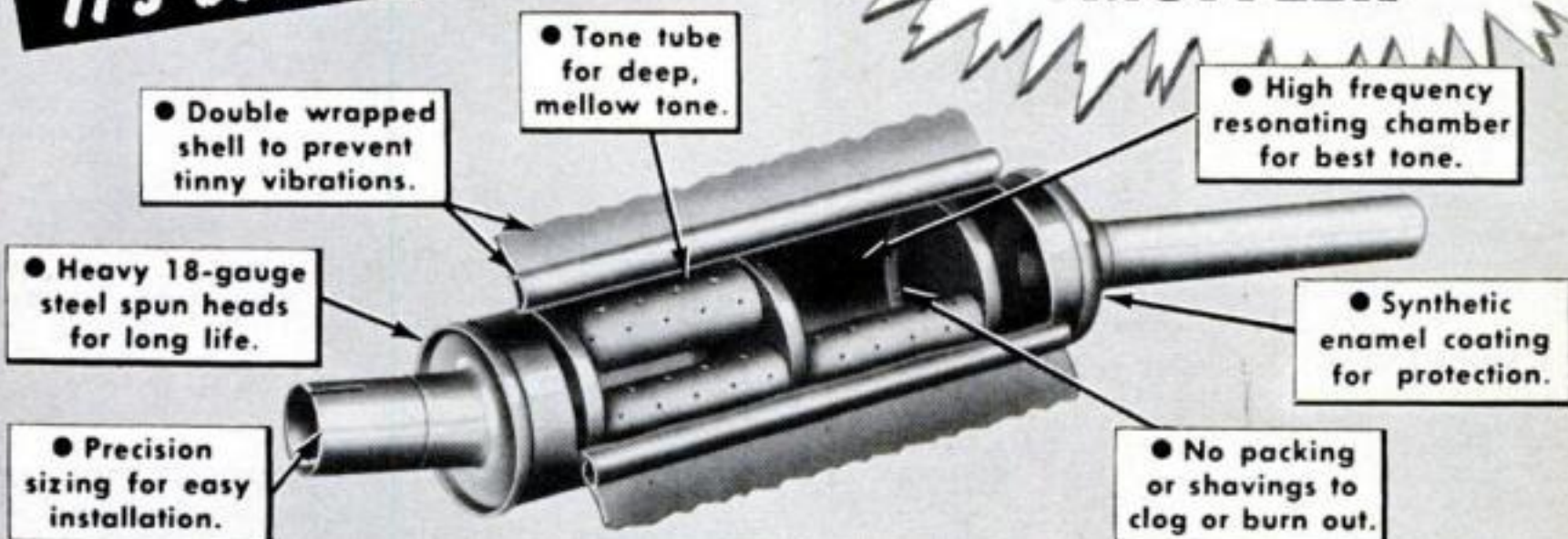
145 SOUVENIRS

ARMY Emblems; 30 different 50c. Prices. Hobbyguild, Box 71, Station A, Brooklyn.

IT'S HERE . . .
IT'S DIFFERENT . . .
IT'S DYNAMITE . . .

DYNATONE

Deep, Mellow Tone MUFFLER



ENGINEERED—Not Packed
YET COSTS LESS THAN MOST HOLLYWOOD MUFFLERS!

The Dynatone has guts! It's the only special muffler engineered for your car. You'll go for its deep, mellow tone—and you'll go for these features, too —

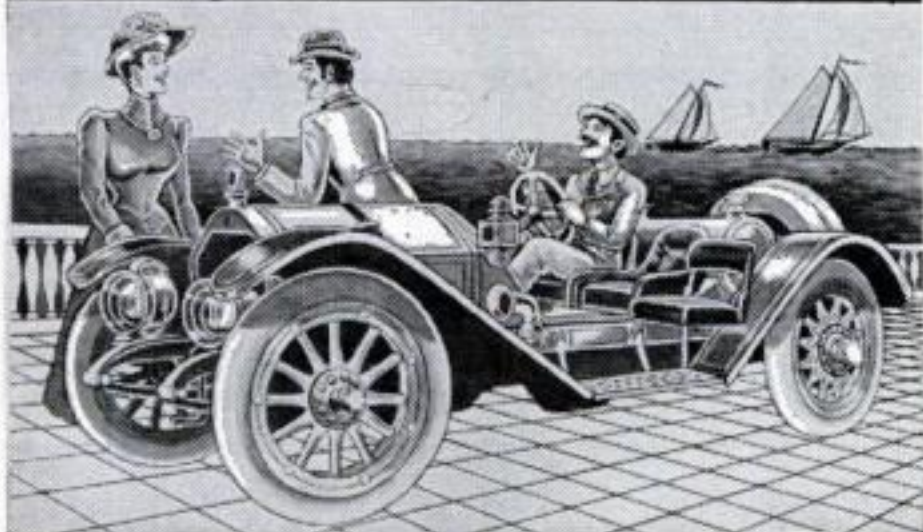
- Lower back pressure
- More power
- More gas mileage
- Longer Life
- No tinny vibrations

Listen to a phonograph recording of the Dynatone at your automotive dealer. Or write us for the name of your nearest dealer.

GOERLICH'S 621 Smith Street • Toledo 1, Ohio

MINIATURE OLD TIMERS AUTO SET

MERCER 1911 Model Raceabout \$3.95



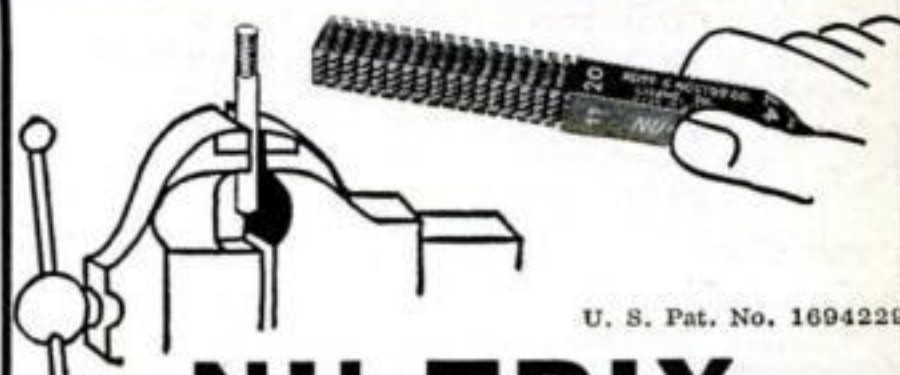
Here's that famous sports car that had grandpa all agog in 1911! The MERCER Raceabout featured an extra side seat—now banned. It's one of the great cars of an era that produced the Stutz—one that you will want to build and treasure forever! Comes complete with easy to follow instructions, plastic wheels, head lamps, cowl lamps, radiator, horn and steering wheel. Length 9 1/4"—Only \$3.95.

1911 Maxwell.....\$2.50	1910 Model "T"
1903 Model "A"	Ford .....\$2.50
Ford .....\$2.50	1903 Rambler .....\$2.50
1904 Olds .....\$1.95	1909 Model "T"
1909 Stanley	Ford .....\$2.95
Steamer .....\$2.95	1900 Packard .....\$2.50
1911 Buick .....\$2.50	1903 Cadillac .....\$2.50
1914 Stutz	1910 International
Bearcat .....\$3.95	Harvester ..\$2.95

FREE!
Write for
Your Copy of
Our 4-Color
FOLDER!

SEE them at your hobby, toy, or department store, or write to us
Add 25c for postage and handling; no C. O. D.'s, please.

Hudson Miniatures' "OLD TIMERS"
S CRANTON HOBBY CENTER, Dept. 28, Scranton 10, Pa.



NU-TRIX

THREAD RESTORER

Use it Like a File, Fix Battered Threads on Bolts, Shafts or Studs, etc., with a Few Strokes.

A Tool Box necessity—8 Tools in one
No. 1 Nu-Trix for 11, 12, 13, 14, 16, 18, 20 & 24 Thds. per in.
No. 2 Nu-Trix for 9, 10, 15, 16, 20, 26, 28, 32 Thds. per in.

Price 2.00 ea. P.P. Prepaid

REIFF & NESTOR COMPANY Box G
Lykens, Pa., or your local jobber

Enclosed Money Order \$..... or Check
please send No. 1 No. 2 Nu-Trix

Name.....
Street.....
City.....Zone.....

ENJOY THE COMFORTS OF HOME IN YOUR AUTO OR BOAT

THE TRAV-ELECTRIC

110 volts of electricity in your car. Just plug in cigar lighter*. Small enough to hold in your hand, yet has plenty of power to operate 110 volt AC-DC radios in cars & boats or will operate 40 watt extension lamp in cabin, trailer, garage, etc. Will also operate electric shaver by using QUIK-SHAVE shown below; ideal for picnics, outings or on the highway. Operates from 6 volt battery, puts out AC 110 volts. Battery drain under load only 4-5 amps, or less than average car radio; **\$9.95** 2 1/2 x 2 1/2 x 3 1/2", wt. 3 lb.



THE KAR-SHAVE for salesman, tourist, trucker, sportsman. Use your present electric shaver in your car, boat or trailer. Just plug into cigar lighter*, then plug in shaver & relax for a smooth shave. Same size & shape as TRAV-ELECTRIC but draws only 3 amps..... **\$9.95**

THE QUIK-SHAVE Shave in less time with this tiny converter. Changes AC to smooth DC. Your shaver will operate smoother and faster. Plugs directly into 110 AC outlet in your home or can be used with TRAV-ELECTRIC (above) for smoother, faster shaves. Only 2" x 2" x 1" (same size as cigarette pack). Weight **\$3.95** 3 oz.



THE BOT-O-MOBILE for heating Baby's food or bottle while driving. Hangs anywhere. Just plug into cigar lighter*. Heats full bottle in approximately 8 minutes..... **\$2.95**

DEALERS: WRITE FOR DISCOUNTS

*NOTE: IF YOUR CAR OR BOAT IS NOT EQUIPPED WITH CIGAR LIGHTER SOCKET, WE CAN SUPPLY ONE FOR \$1. Postage paid anywhere in U. S. Send money order or check with order. Money-back guarantee.

THE KAR-JOY CO.

BOX 5163 Donaldson Sta. TULSA, OKLA.

POWR-PAK EXTRA HEAVY PURE GUM RUBBER (600% ELONGATION)

PISTOL SLING COMPARE!

Not a toy! A perfectly balanced small arm for sport and small game! Special introductory offer: "Powr-Pak" Pistol Sling, 50 "Tru-Flite" 23 gr. pellets, extra sling, 10 "Red Dot" targets, postpaid, **\$2.25** cash, check or money order. No COD's! Money-back guarantee. Order yours today from **Baron Industries, Box 3578M, Cleveland 18, Ohio.** Order extra supply 23 gr. "Tru-Flite" Pistol Sling pellets with your Powr-Pak. 250 for **\$1.00.**

Labels: BONDING POUCH NO STRINGS, INSTANT RELOADER, THUMB REST, PISTOL GRIP MAGAZINE HANDLE, PRECISION CAST & MACHINED ALUMINUM FORK & FRAME, PRESSED WOOD SIDE GRIPS

HUSKY HITCH

WORLD'S FINEST TRAILER HITCH
Acts As Rugged Bumper Guard

FREE FOLDER!

Write, give car make, year.

HUSKY HITCH, Dept. PS-70, 118 E. Pomona Ave., Monrovia, Calif.

NEW STREAMLINED TRAILER HITCH CUSTOM MADE FOR YOUR NEW CAR!



Handsome Husky Hitch is a heavy duty trailer hitch with boat keel design, railroad coupling construction. No extras to buy—everything furnished!

- Rust-proof hitch ball
- Smooth contours prevent snags
- Permanent gleaming chrome plate
- Hitch ball has removable cap cover

HIGH POWER TELESCOPE

60 POWER-ALUMINUM TUBES-OPENS TO 33"

Variable Power Eyepiece Adjustable to 15X, 30X and 60X.

\$4.50

Leather Case Included

5 Sections. 4 Ground & Polished Lenses. Also used as 50X Microscope. Ready to use. only **\$4.50 POSTPAID.**

BROWNSCOPE CO.

Dept. 7P, 24 W. 45th St. NEW YORK 19, N. Y.

Pioneers **BENJAMIN** **Leaders**

AIR RIFLES **AIR PISTOLS**

SHOOT WITH SAFETY

BE SAFE—SHOOT WITH COMPRESSED AIR—ALWAYS READY
No Cartridges or Tanks to Replace or Recharge. If you want the most PRACTICAL GUN to use anywhere—inside or outdoors—get a SAFE—CLEAN—ECONOMICAL BENJAMIN with Adjustable Power and Amazing Accuracy. Send for Free Folder of Latest Models Today. **BENJAMIN AIR RIFLE CO., 853 MARION ST., ST. LOUIS 4, MO.**

Have Fun with your own Outdoor Fireplace

Build it Yourself — It's EASY
Everyone loves to cook and eat outdoors. For a fireplace that costs less and works right, just fit masonry to this Model OF-28. 21" high, 26" long, 13 1/2" wide. See your dealer or order direct. Send money order or check. **\$17.95 Complete.**

SEND FOR THIS BOOK OF DESIGNS
52 pages of helpful tips on fireplaces and outdoor cookery... Send 25c for your copy.

The Majestic Company
371 Erie Street, Huntington, Indiana

FREE Bargain Book

Packed with hundreds of sensational bargains—new and used—in still and movie photo equipment and accessories. Write for your free copy today to **Central Camera Co.** Dept. 10G, 230 S. Wabash, Chicago 4, Ill.

Photographic Headquarters Since 1899

ONAN Portable ELECTRIC PLANTS

FOR CABINS, TRAILERS, CONTRACTORS, BOATS

Light weight, compact, air-cooled engine-driven. Furnish regular city-type A.C. electricity for lights, appliances, radios, etc. Can be carried by hand. Fit trunk of car. Plug-in receptacles on plant. Larger models for farms, homes, businesses beyond highlines. Catalog shows over hundred models. 350 to 75,000 watts.

Gasoline or Diesel Powered
Prices begin at **\$169.50**

WRITE FOR CATALOG
D. W. ONAN & SONS INC.
2809 Royalston Ave., Minneapolis 5, Minn.



STOP DRIP

caused from condensation on cold water pipes. Turn idle basement space into play or work rooms. Keep store rooms dry. Just wrap cork-filled No-Drip Tape around pipes and joints.

Do it yourself. Clean and easy to apply. Roll covers about 10 feet of 1/2" pipe. \$1.69. Higher west of Rockies and Canada.

**NoDrip
TAPE**

Get at Hardware, Department Stores, or sent post-paid. Write for free circular. J. W. Mortell Co., 534 Burch St., Kankakee, Illinois.



BETTER PERFORMANCE FOR OUTBOARD MOTORS



Enjoy more speed, smoother performance, greater carrying capacity by equipping your motor with the Michigan propeller recommended for your particular motor and type of boat used. Write for FREE copy of 1950 catalog — "Outboarder's Bible" covers all motors old and new. Describes the "Aqua-Jet," super speed wheel for racing runabouts. For finer inboard performance investigate our "Aqua-Master." Write NOW! Michigan Wheel Co., Dept. J-1 Grand Rapids 3, Michigan.

TENTS & CAMPING EQUIPMENT

New Tents: 2-man mountain style nylon \$15.95; canvas \$11.95. 5 x 7 wall \$10.95 7 x 7 \$12.50. War Surplus, used, reconditioned: Pup tents, single flap \$2.95; double flap \$3.95. 9 x 9 wall \$21.95; 16 x 16 \$32.95. Poles & Stakes included. Check or M.O. Money Back Guarantee. Free Tent & Camping Catalog.

MOR-SAN-SALES 10-19D 50th AVENUE
LONG ISLAND CITY 1, N. Y.

SAVE 1/3 ON NEW POWERBIKE!

PRESTO—your bike's a speedy POWERBIKE when you install new POWERBIKE unit. Amazing new DIRECT FROM FACTORY PLAN now offers you speedy low cost transportation for only \$18.23 down. Send stamp for FREE PICTURE CATALOG.

SAGINAW PRODUCTS CORP.
113 River St. Saginaw, Mich.



FENDER SKIRTS \$9.95 PER PAIR

For 95% of all cars. Beautify your car . . . bring out the flowing lines designed in it. Sparkling beauty you'll like. Constructed of heavy gauge body steel, finished in prime. Perfect fit. Prompt delivery.

SANDEE MUFFLER CO.
5643 Carryne Place
Culver City, Calif.
Gentlemen: Please send me one set of Sandee Fender Skirts to fit my (year and make of car).
☐ Check or M.O. for \$9.95 enclosed. No C.O.D.s at this low price, please.

CROSLLEY HOTSHOTS TAKE TOP HONORS

in Famous European Race



In the Grand Prix de la Suisse Occidentale for sports cars up to 750 ccm, Mr. Fritz Feierabend driving a Crosley Hotshot equipped with a compressor Italmechonica was victor with an average speed of 82.5 km/h and the best time for one lap of 87 km/h. Second in this class was Mr. Oviedo Bernasconi with a Hotshot absolutely stock car. Mr. Fritz Feierabend with his winning Crosley is shown in the illustration above.

See the latest Crosley Super Sports. Two passenger, a new thrill in motoring. Now with folding top, zipper side curtains, complete plastic leather cockpit edge trim—PLUS all the famous features of the prize winning Crosley HOTSHOT.



FREE! Latest 1950 CROSLLEY CATALOG. Write Crosley Motors, Inc., 2530-JT Spring Grove Ave., Cincinnati 14, Ohio.

CROSLLEY
a FINE car

You see them everywhere!

YOU CAN BUILD A KIT-CRAFT BOAT

**SAVE
over
50%**

Complete for
Easy Home
Assembly



No experience necessary. All parts factory cut, easy to assemble with step-by-step directions. Full length 100% marine plywood panels. All hardwood frames. Rugged, guaranteed, safe construction. Designed by marine architect. **\$32.35** 6 models from

Illustrated catalog 25c. In Canada contact Sturdy Plywood and Woodworking, 1927 Davenport Rd., Toronto, Ontario. Canadian Affiliate.

ROBERTS INDUSTRIES, INC.
352 Main St. Durham, Conn.

JULY 1950 73



Look! No Oars! No Motor! New PROPELOAR

Twice as fast as rowing, and twice as easy! It's noiseless, practically effortless. Forward... backward... set your own pace. Both hands free for rod, gun, or what have you? Lightweight aluminum. Fold for easy carrying, attach to almost any boat in one minute—no tools. Boatloads of fun for vacation. Only \$49.95 to buy... no cost to operate!

Send for free folder today!

PRODUCTION ENGINEERING COMPANY

942 Dwight Way

Berkeley, California

EVINRUDE Catalog Free



Write today for complete catalog of the Evinrude line—the right motor for every boat. Thrilling new 1950 models—new Fastwin with Gearshift and Cruis-a-Day Tank, New Fleetwin with Duo-Clutch. Two models with revolutionary Fisherman Drive. Send for your copy today—address

EVINRUDE MOTORS

4522 N. 27th St., Milwaukee 16, Wis.

BINOCULARS

BRAND NEW. Military type—Achromatic lensel Have precision ground optics, lightweight metal bodies. Moisture—Dust proofed.



6x25 Regular	.....	\$26.00
6x30 Regular	.....	31.50
6x30 Coated	.....	34.50
8x30 Regular	.....	33.00
8x30 Coated	.....	39.50
8x40 Regular	.....	46.50
8x40 Coated	.....	49.50



6 POWER PRISM BINOCULAR FITS PALM OF HAND



Coated! Dynamic in power. 370 ft. field at 1000 yds! Achromatic lenses. Individual eye focussing. Weighs 4 ozs. All metal construction. Adjusts all eye widths. Quality binoculars that bear the United seal on their frame. Because they are made to rigid UNITED specifications, America's leading binocular house—**\$19.50**

All binoculars have individual eye focussing. Prices include genuine leather case and straps. **TRY FOR 20 DAYS AT OUR RISK!** If not fully satisfied return for full refund! Cash orders rushed postpaid. On C.O.D.'s include \$2.00 deposit. Add Federal tax. **UNITED BINOCULAR CO., 7941 S. Halsted, Dept. ARF-2716, Chicago 20.**

now YOU CAN DRILL YOUR OWN WELLS!

Sturdily Made—Hundreds of satisfied customers. Purchased and used by U. S. Dept. of Agriculture, U. S. Dept. of Forestry, U. S. Navy and many foreign countries. Fully Guaranteed.

NEW LOWER PRICE \$345.00.

Less Motor, F.O.B. Factory. Price includes drill, bailer and 100' cable. 200 ft. of additional length available at extra cost.

Drill your own wells for that needed water—as many as you need—outside—in the cellar—in the barn. The new improved **CONSOL Driller—1950 Model**—is equipped with a special replaceable Drill Head. It will drill through many feet of solid rock without resharpening. Simple to operate, easy to set up. Do the work yourself at small cost.



A **HEAVY DUTY MODEL** for 6" casings also available at \$1295., F.O.B. Factory, equipped with Gasoline Engine.

Write for free information and booklet, Dept. PS.



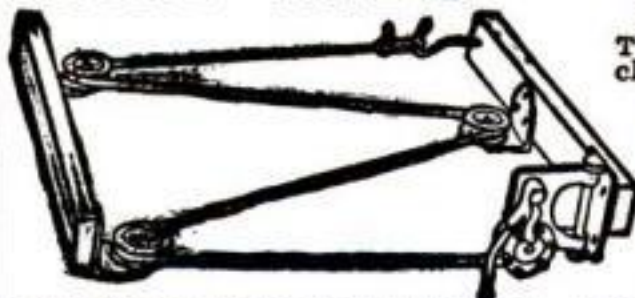
CONSOLIDATED INDUSTRIES

West Cheshire, Conn.

LINE-TITE



THE MODERN CLOTHESLINE TIGHTENER



Throw away your clothes poles! Never again be bothered with knotted rope ends! Install **Line-Tite** and your clothesline problems are over. Simply pull line to desired tightness—it is set securely by

ratchet lock. Set includes tightener, 3 pulleys, hook, screws, all rust-free. For inside or outside use. **Order today \$2.00** postpaid in U. S. Extra pulleys 35c each.

Satisfaction guaranteed. Agents invited.

REID MACHINE CO., Route 3, Box 602A, Rochester, Michigan.

PARTS FOR MILITARY TRUCKS

At Big Savings. New **FREE** Catalog For Jeep, Dodge, Chevrolet, G.M.C., Studebaker

Brand New JEEP TOP and CURTAINS

Fits all Military Jeeps. Also adaptable to Civilian Jeeps.....**\$49.50**



UNITED AUTO PARTS CO., INC.
1901 TROOST GR. 1800 KANSAS CITY, MO.



ZIPPY WASHER

MAKES FUN OF WORK

Zippy Washer works like magic on cars, windows, screens, boats, walls, etc. Attaches to any garden hose. Water sprays through brush. No soap, no pails, no cloths. Rinses as it washes. 5" brush with soft bristles and heavy rubber bumper, no marring or scratching. 4 ft. aluminum handle. Light, easy to use. Full money back guarantee. Send \$3.75. Check, money order. Also C.O.D.

PRECISION PUSH BUTTON VALVE

For brush, spray or any garden hose use. Instant acting. Complete finger control. Satisfaction guaranteed. Only.....

\$2.89



NELSON-KAUTZ MFG. CO.

P. O. BOX 277, P-7

Bradford, Pa.



MEN WANTED as Local Manufacturers of New Masonry Wall Unit

CAVITEX is today's masonry—colorful, streamlined, scientific. Yet with price appeal to override competition. Size and proportion in direct line with modern architectural trends. Dimensions strictly according to modular standards. All the strength, safety and endurance of masonry at its peak point.



Outstanding Opportunities

For Men of Vision—Cavitex can be made locally—of local materials, with local labor. Freight and distribution costs are saved. That's why Cavitex can be sold so low, yet still allow 100-150% mark-up on basic costs. Plants are compact, self-contained, require no skilled labor. We supply complete equipment—cash or time. Hundreds of territories open. Tie in with Cavitex and ride the tide of biggest building cycle in history. Write for full information at once.



W. E. DUNN MFG. CO.
410 W. 24th ST. HOLLAND, MICH.

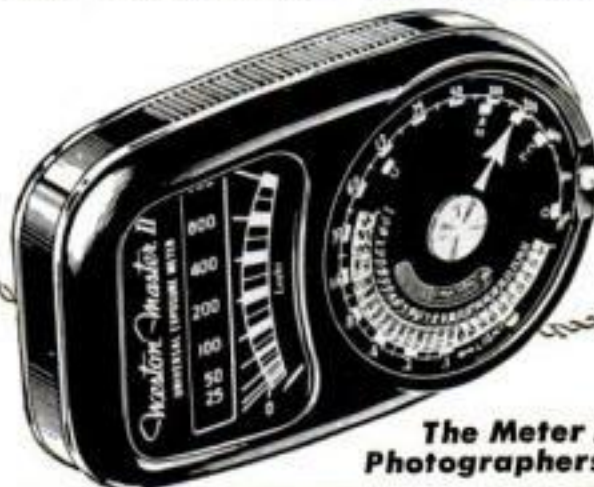
Forget Something?



Forget your toothbrush . . . forget your tickets . . . but *don't* forget your WESTON! You'll want your vacation shots to be perfectly exposed. You'll want color-true pictures every time. And you'll get them if you remember your WESTON. Ask your dealer.

WESTON

EXPOSURE METERS



The Meter Most Photographers Use

NEW PACKAGED BOATS



17 models, 8'-16': Tredonie racers, cruisers; Outboard, inboard, skiffs. Assembled frames; Tri-Keel construction; Tredonie bottom; spray rails; easy to build!

SEND 25c FOR CATALOG!

Catalog and booklet "Plywood Boats", \$1.00

BOAT PATTERNS-BLUE PRINTS

1950 Catalog—100 designs by naval architects. Racing classes, cruisers, inboard, outboard, sail, 6 to 35 ft. Plywood—Steel—Plank. Construction plans, full-size patterns. **SEND 35c FOR CATALOG** or \$1.00 for catalog and booklet on "Boat Building."

MARINE MART-DEPT. 24-BUFFALO 7, N. Y.

Keeps You Out of Trouble

HULL

AUTOMOBILE COMPASS

The best automobile could get you into trouble without instruments—to make sure gas, oil and water are at proper levels, etc. That's why hundreds of thousands drive by **HULL AUTOMOBILE COMPASS**—to make sure everything is running right—and in the right direction.

Beaconlite illuminated **\$5.95** Streamline standard **\$3.95**

At your dealer's. Write for circular.

HULL MFG. CO., P. O. Box 246-E7, Warren, Ohio



HY-SCORE 5 in 1 AIR PISTOL



World's finest airgun. Safe to use. Has quality finish, precision of fine revolver.

Kills Game, High Powered, Accurate

Barrel changes to accommodate 5 types of ammunition without loss of power. Shoots .22 or .177 cal. pellets, darts or BB's. Single shot, semi-automatic loading. Cock & load in 6 seconds. Rear shutter-type load. Single compression action. Fire 5 shots in 1 minute. More hits, better results. 7 1/2-in. rifled barrel insures maximum power & accuracy. Adjustable rear sight. Blued steel finish. Tenite moulded plastic grip, same as Army pistols. Fully guaranteed. Economical

\$19.95

Most Powerful Air Pistol Made

to use. 5x8-in. Wt. 2 lbs. **ONLY \$19.95**
500 .177 pel. \$1.50; 500 .22 pel. \$2; BBs, 500—25c; Darts, 35c pkg.
JOHNSON SMITH & CO. Dept. 253 Detroit 7, Michigan

Cushman
MOTOR SCOOTER

75 MILES PER GAL.

RIDER AGENT PLAN AVAILABLE

Own, operate and maintain it for less than 1/4c a mile! Wonderful in traffic, picks up fast, slips through narrow places. Parks anywhere. Ideal for getting to work, school, market—doing errands, making deliveries. Powerful engine, brakes.

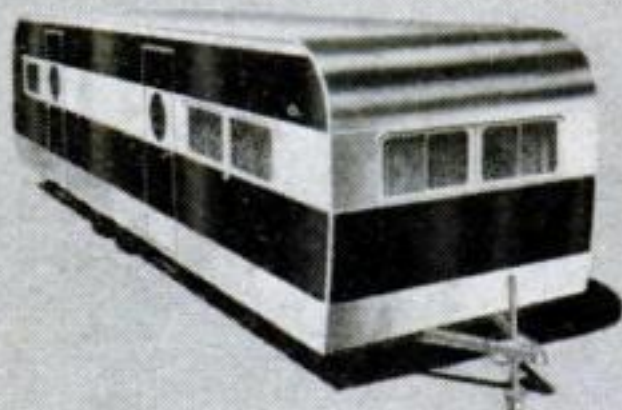
See your Cushman dealer. Or, rush card for Free Book.



CUSHMAN MOTOR WORKS, Dept. P-7, Lincoln, Nebr.

Excitingly New

THE NEW MOON FIFTIES



It's the ultimate in mobile living comfort--and it's taking the country by storm! Now in 21, 25, 33 and 40-foot models, the NEW New Moon incorporates dozens of advanced engineering and design features for better living...all at amazingly low cost! See New Moon for yourself at your nearest dealer's, or write for Free illustrated literature--Today!

REDMAN TRAILER CO.
38 BRIDGE ST., ALMA, MICH.

AIRCRAFT INVENTION

ROLLS YOUR CAR INTO THE AIR

LIFTS AND LIFTS—

There is no other automobile jack like it. This Saginaw super-jack literally rolls a car into the air. Ball-bearings, rolling between the raceway-shaped threads, reduce effort through increased efficiency—give you remarkable lifting power.

EXTRA SENSIBLE—

There's common sense in buying a Saginaw jack. Added to safety and ease of operation, there is real economy in a jack built to last for years. One good jack is worth more—costs less—than several poor ones.

GET YOURS NOW—

See your nearest United Motors service station.

UNITED MOTORS SERVICE, DEPT. S-31
General Motors Building, Detroit 2, Michigan
Send me more information about the new Saginaw Jack and where I can buy it.

SAGINAW Recirculating-Ball BUMPER JACK

LASTS AND LASTS—

Tested and proved, this exclusive principle actuated bomb bay doors and wing flaps in thousands of warplanes. The heavy base is permanently attached—can't come loose. The rugged steel construction is built to outlast your car.

EXTRA SAFE—

Won't slip, won't spin, no fluid to leak, no notches to wear. Recirculating balls hold your car where you want it. No kneeling or stretching to prop it under your car. It fits every bumper. Safety like this can mean more than money to you.

Easy To Build

U-MAK-IT BOAT KITS

ROWBOATS

OUTBOARDS

INBOARDS & CRUISERS

SEND 25c (coin)
NEW CATALOG
ORDER YOURS TODAY

U-MAK-IT PRODUCTS 703R-WHITTIER ST.
New York 59, N. Y.

FREE 1950 JOHNSON SEA-HORSE HANDY CHART

Full, exciting details on the 5 great Johnson outboard motors for 1950. Complete description of new Neutral Clutch, Gear Shift Control. Write...

JOHNSON MOTORS
500 Pershing Rd., Waukegan, Illinois
In Canada: Johnson Motors, Peterboro



Seen the NEW Crosman CO₂ PISTOL & RIFLE?

They're sensational... a revolutionary, new idea in "power without powder" guns that is sweeping the country. Ask your Crosman dealer to demonstrate their many exclusive features. Write for literature.

Crosman Arms Co., Inc. • Rochester 7, N. Y.

BUILD YOUR OWN FAN

One-piece cast aluminum propellers for cooling and ventilating.

Size Inches	Polished 2 Blade	Polished 3 Blade	Unpolished 2 Blade	Unpolished 3 Blade	Bore Inches
15	\$3.00	\$4.00	\$2.50	\$3.00	1/2, 5/8, 3/4
18	3.75	4.50	3.00	3.50	1/2, 5/8, 3/4
20	4.00	5.00	3.25	4.00	1/2, 5/8, 3/4
24	4.50	5.50	4.00	4.50	1/2, 5/8, 3/4

Let us give you our prices on your aluminum castings.

Write for pamphlet on larger fan blades, wire guards, fan bases, shutters, pillow blocks, exhaust fan frames, etc. Shipped prepaid if money accompanies order. Dealers write for discount.

KLOPPENBORG ALUMINUM FDY., Dept. PS70, Davenport, Iowa

It's Bright— It's Pocket Size!

It's palm-size—shaped to lie flat in small spaces. Brilliant light! Rust-proof. Dent-resistant.

Luminous switch. Uses 2 standard 1 1/4-inch flashlight batteries. Price, less batteries...

DELTA ELECTRIC CO., MARION, IND.



\$1.75

Delta BUDDY LITTLE ELECTRIC LANTERN

FUN FOR ALL . . . A COMPLETE WATER PLAYGROUND

for Cottage, Lake, Riverfront, and a Wading Pool for the backyard, too! Wood deck may be built on top or use as is for Boat Dock, Float, WarCanoe, WadingPool, etc. Easily stored for winter. 28 1/2 ft. long, 7 1/2 ft. wide, 30 in. deep. Heavy-duty reinforced rubberized fabric . . . six separate compartments and a removable center section each inflate to only 1 1/2 pounds pressure; supports 12 tons. Made for U. S. Army pontoon bridge.

Write for circular or
ORDER NOW! Limited quantity.

FOB Memphis, Tenn. Ship. wt. 885 lbs.
Send check or money order.

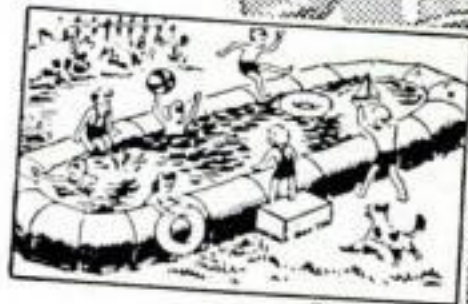
WINTHROP ASSOCIATES
25 Arch St. Boston, Mass.
Department PS

BRAND NEW! . .

58.50 Each

Two for \$100.

*Cost U. S. Gov't. \$980.



Coronado "pose-breefs"

THE NEW BODY-MOLD TRUNKS FOR
IDEAL BODY DISPLAY. WORN BY LEAD-
ING BODY BUILDERS OF THE WORLD!

Here's the perfect brief trunks
for body building, lifting,
swimming, physique photog-
raphy and contests. Designed
by champions... worn by lead-
ing body builders of the world.
No bind, no boxed or chop-
ped off appearance. Body-
mold fit for tall or short men
in sizes 26 to 38. Complete
freedom... complete coverage.
Satisfaction guaranteed. Send
check or money order today.
Postpaid.

8 colors: white, black, light blue, royal
blue, red, gold, aqua or chartreuse.

1. Elasticized Nylon, the very finest . . . **795**
2. Elasticized Nylon and Acetate . . . **595**
3. Elasticized Satin Acetate . . . **495**
4. Workout trunks Assorted colors . . . **395**



**A TWO-INCH
HIGH WAIST**



**B MEDIUM HIGH
THIGH CUT**



**C EXTRA HIGH
THIGH CUT
(BELOW)**



**LEO
STERN**

Mr. California

'46

shown above

in his

"pose-breefs"

BIG PROFITS FOR YOU



**Making
Finished Photos
in 2 Minutes!
Wonderful
Photo Invention
PDQ
CHAMPION
PHOTOMASTER**

Takes and finishes 30
to 40 photos an hour

**COMPLETE PORTABLE
PHOTO STUDIO**

Size 4 1/2 "x5" x10"
Weights only 6 lbs.

OVER 700% PROFIT!

Beautiful, everlasting photos — black and white or sepia, size 2 1/2 x 3 1/2 in. Guaranteed not to fade. No dark room needed. Photos are taken DIRECT on "SUPER SPEED" direct positive paper. Loads enough paper for 50 shots in half a minute — in broad daylight.

BE A P.D.Q. PHOTOGRAPHER

No experience required. Simple directions teach you quickly. Work at home or travel. Make expenses plus extra profits. Pictures cost you only 2c. Sell for 15c to 25c. Folks just grab for 'em. They are amazed to see their own photos come to life in broad daylight. Photomaster "shoots" any subject — individuals or groups — buildings and scenes. This new and fascinating business offers unheard-of money-making opportunities everywhere — every day throughout the year. **DETAILS FREE! WRITE**

P D Q CAMERA COMPANY

1161 N. Cleveland Ave., Dept. PS-7, Chicago 10, Ill.

Coronado Surf Shop,

627 8th Avenue, San Diego 1, California

Please send me, postpaid, Pose-Breefs as follows: (Circle)

Style **A B C** Fabric No. **1 2 3 4**

Color: 1st choice _____ 2nd choice _____ Size _____

Name _____

Address _____

City _____ State _____

☐ Please send your illustrated brochure

Halt Engine Overheating



Before You Get Burned!
Add **BARDAHL**
to Your Crankcase Oil

Stop dangerous heat that runs up repair bills! Simply add one quart of BARDAHL to regular oil.

Before you drive 10 miles, you'll see the difference. Temperature goes down—compression goes up. Motor runs better, sounds better than ever before.

BARDAHL penetrates metal pores, clings to friction surfaces. It's the perfect way to loosen up tight engines on new cars or overhauled cars.

Ask the best mechanic in town about BARDAHL. He's been using it for years!

BARDAHL
OIL

*Reduces Friction
to a Fraction*

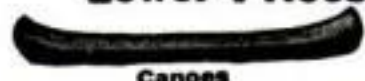
BARDAHL OIL COMPANY
Seattle • St. Louis



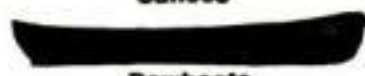
Thompson
BEATS
the World
on BOATS



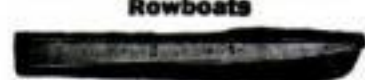
**Better Built
Lower Prices**



Canoes



Rowboats



Outboards



Light Boat for Auto

**Safe Boats With
Full Length Spray Rails**
Keep passengers perfectly dry—even at high speeds. Catalog also shows two new models of "Take-Along" Boats. Two big factories—save you freight.

CATALOG FREE
Write for your copy. State kind of boat in which you are interested.

THOMPSON BROS. BOAT MFG. CO. (151)
219 Ann St. PESHTIGO, WIS. (Write to either place) 119 Elm St. CORTLAND, N.Y.

STOPS LEAKS PERMANENTLY

Cut your fixture replacement, water and fuel bills with Economy Renewable Seats. Make economical, permanent repairs quickly and easily with the Junior Kit (illus.). Repair bathroom, kitchen and laundry fixtures. Everything you need included in steel box. This is a natural for the "Fixit" shops—get extra income from making permanent repairs on your customers' faucets.

Senior Master Kit also available—repairs faucets and valves up to 1" pipe. Write for illustrated circular and prices.



NEW "JIG-A-VISE"

3 tools in one—a Jig . . . a Jack, and a Vise. Ideal for handymen, model makers, home workshops. Use it for holding any piece for drilling, finishing, assembly. Assures accurate work as all surfaces are ground true. Write for complete information and illustrated circular.

ECONOMY VALVE SEAT CO.
3122 N. California Ave., Chicago 18, Ill.

PLYWOOD BOAT KITS

\$87⁵⁰
(Freight included)



Build this 12-ft. sport run—about from ready-cut parts. Kits include all hardware, paint, etc., to complete the boat shown. Send for free folders of all models as low as \$29.95 freight included.

TAFT MARINE WOODCRAFT
Dept. S. 636 39th Ave., N. E., Minneapolis 21, Minn.

WHIZZER 3 H. P. MOTOR

America's finest bike motor

Make your bike a lively, powerful motor bike with big, new Whizzer 3 h. p. bike motor. 4-cycle, 138 c.c. 5 to 40 m. p. h. Up to 100 miles per gallon. See your Whizzer dealer or write WHIZZER MOTOR CO., 320 S. Sanford St., Pontiac, Mich.



MAKE REAL MONEY AT HOME IN TELEVISION

Get to the top faster through practical-shop-training methods! You can earn big money at home while learning; start your own business! Television has proved to be the fastest growing industry in the country. Trained men are in demand NOW for high-paying jobs. RTTA also prepares you for your FCC license! Better pay! Don't wait another day. Send for RTTA's free TV Catalog, Sample Lesson, and details on FREE Round-Trip to New York City from anywhere in U.S. or Canada.

FREE TV CATALOG & SAMPLE LESSON

**RADIO
TELEVISION
TRAINING
ASSOCIATION**

Dept. 257
972 BROAD ST.
NEWARK 1, N. J.

Rush me your FREE Catalog "How to Make Money in Television," in spare time, AT HOME, while learning; details FREE round trip to N. Y. C.; together with FREE Sample Lesson. I am under no obligation.

Name.....Age.....

Address.....

Take the Thrill-road to Good times!

RIDE A NEW 1950

HARLEY-DAVIDSON

HYDRA-GLIDE



RIDE THE "CHAMP"!

You've got a *new* thrill coming!

A touch of the throttle and you're off like a comet! Hills melt away like magic!

Rough roads fly beneath you with hardly a quiver of the handlebars. Steering is feather light.

Braking is smooth and sure. Day-long riding leaves you fresh and ready for more fun as you take in exciting races, hillclimbs, delightful gypsy tours and club events. Easy payment terms bring you this finest Harley-Davidson of all time. See your Harley-Davidson dealer today. Mail the coupon now!

HARLEY-DAVIDSON MOTOR CO., Dept. PS, Milwaukee 1, Wisconsin

Send for *free* copy of ENTHUSIAST Magazine filled with motorcycle action pictures and stories; also literature on new 1950 models.

Name.....

Address.....

City..... State.....

DEALERS: Valuable franchises available for the full line of famous Big Twins and 125 Model. Your opportunity to line up with the greatest name in motorcycles. Write or wire today.

JULY 1950 79

HEAD OF THE LIST... he's got P.A.*



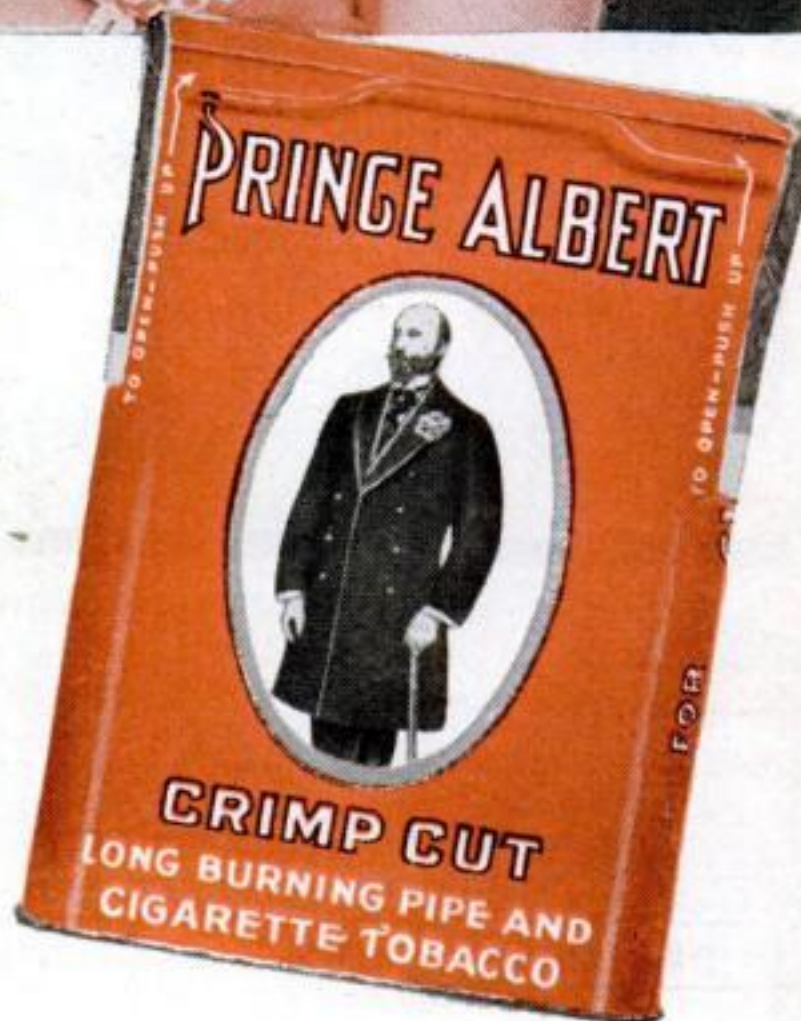
P.A.* means
Pipe Appeal and
Prince Albert

R. J. Reynolds Tobacco Co.,
Winston-Salem, N. C.

● You just know she has him at the head of *her* list. He's got Pipe Appeal! And you can guess he's got mild, rich-tasting Prince Albert in *his* pipe! Crimp cut P. A. is America's largest-selling smoking tobacco! Get P. A.! Prince Albert's choice tobacco is specially treated to insure against tongue bite.



P.A.'S CRIMP CUT
MAKES IT EASY TO ROLL
A FINE CIGARETTE!



THE NATIONAL JOY SMOKE!

Popular Science

Highlights

this Month



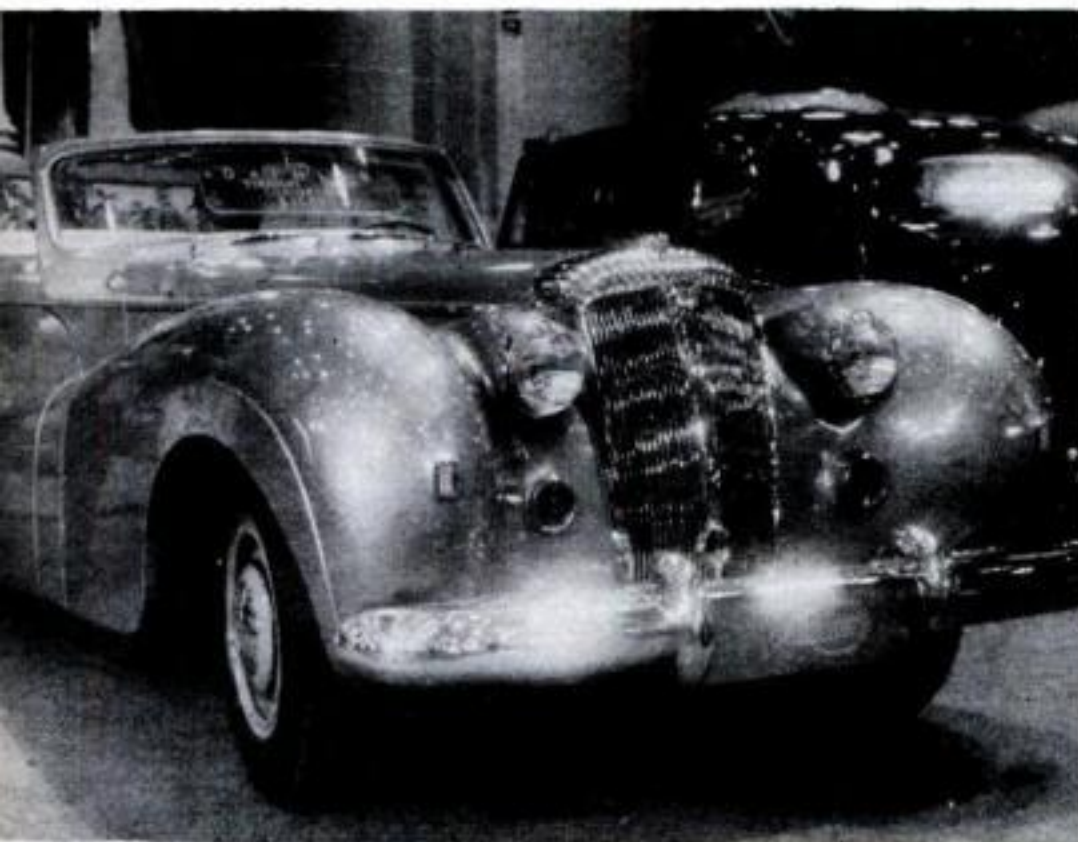
HOME LAUNDRY FOR YOUR CAR: Low-priced spray, fastened inside garage door, gives automobile a wash in six minutes. **Page 138**



TOYING WITH ATOMS: Geiger counters and cloud chambers will keep Junior as busy as the biggest nuclear scientist. **Page 183**



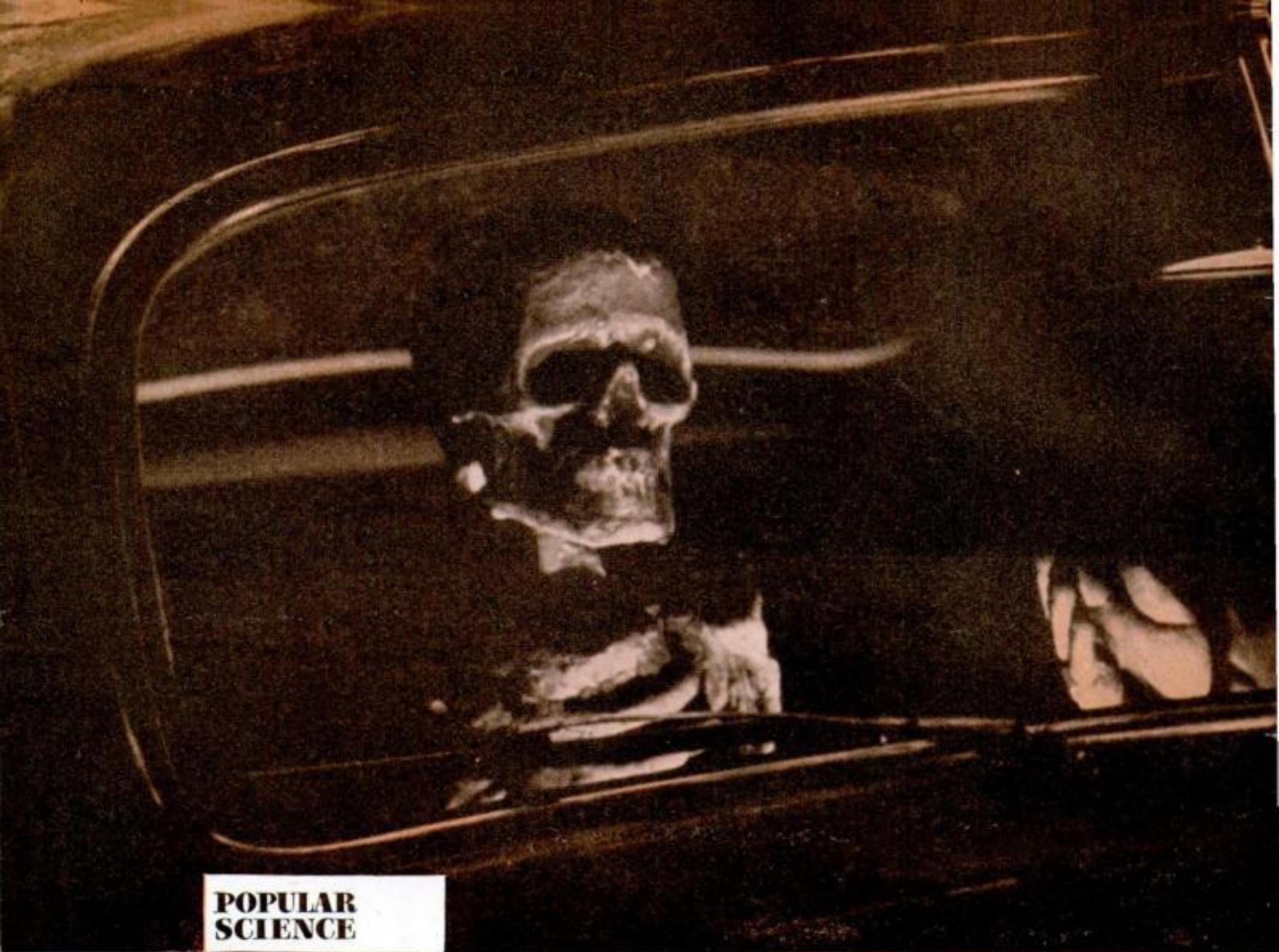
READY! AIM! CLICK! Gunstock camera brings distant subjects up close as you shoot through the telephoto lens. **Page 211**



BRITISH CARS: Six pages of photos show—close up—what's different about new models you'll see on U. S. roads this summer. **Page 126**



BUILD A PLASTIC PARTITION: Handsome new blocks fit right into a framework you can make with a hammer and saw. **Page 180**



**POPULAR
SCIENCE**

Death has an option on the next seat every time you drive.

Making the

Cover by
Reynold Brown



By George H. Waltz, Jr.

PS photos by Hubert Luckett

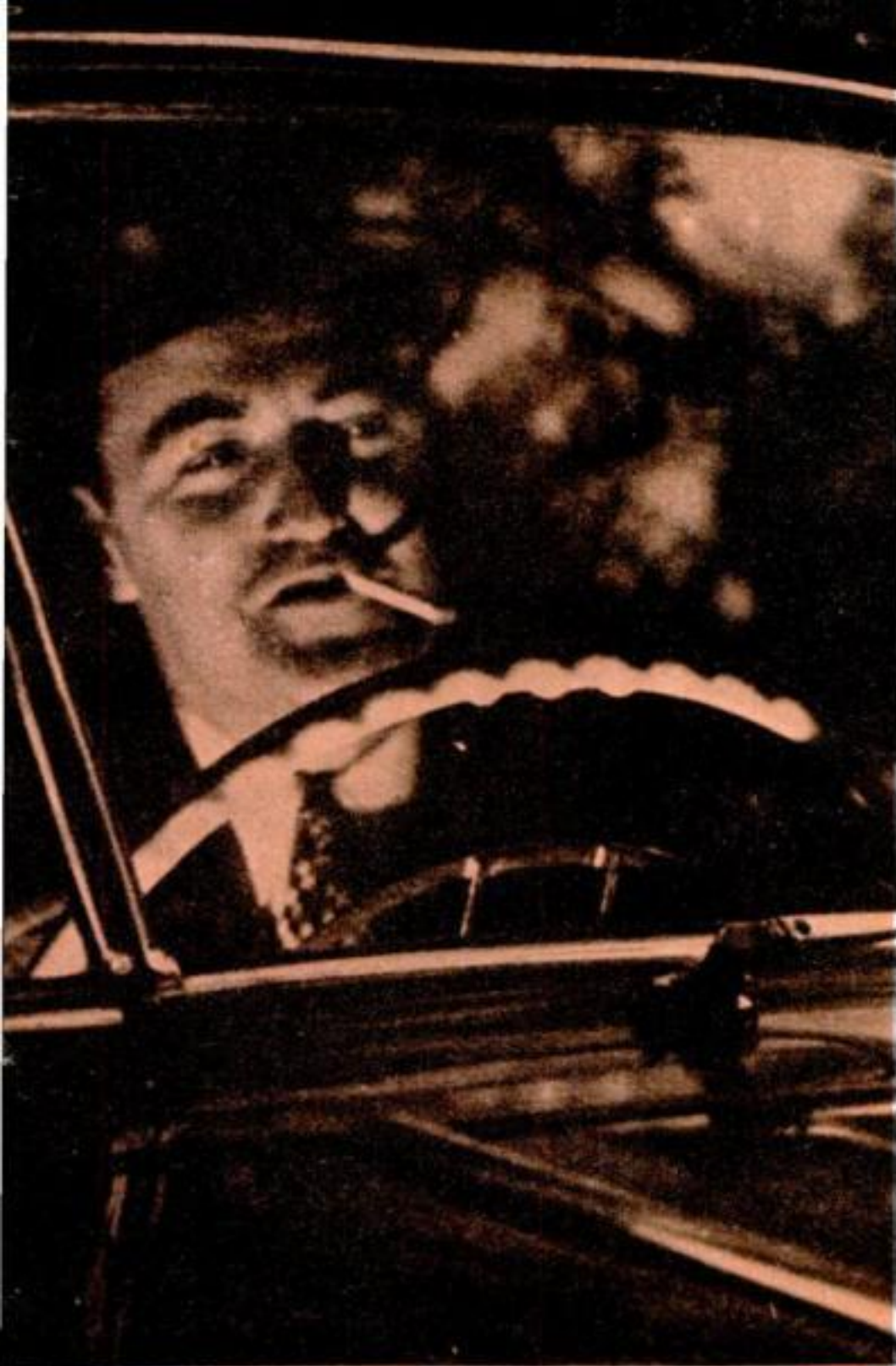
THE most dangerous seat in the world is not the electric chair at Sing Sing, nor the one in the gas chamber at San Quentin—it is the right front seat in any car, *including your own!*

Some 300 holiday-happy men, women, and children, it has been estimated, will meet horrible deaths in automobile smash-ups during the four-day July 4th celebration this year. Many more will be cut, shocked, and painfully maimed. And, according to statistics, approximately 204 of those 300 dead will have been persons who

were sitting in the seat next to the driver!

Death never takes a holiday. He rides in every car, every day, with his bony finger on the right front seat—the death seat—the seat occupied by 68 out of every 100 victims in fatal car crashes, the seat most often occupied by mothers, wives, sweethearts, and children. At that, the figure may be low: not every car involved in a fatal accident has someone riding in the death seat.

Sixty-eight percent is impressive enough however to make safety engineers concentrate on the problem of the right front seat when they study ways of designing safer car interiors. And they're making real progress. At the Cornell Aeronautical Labo-



And it's where your wife or kids usually sit.



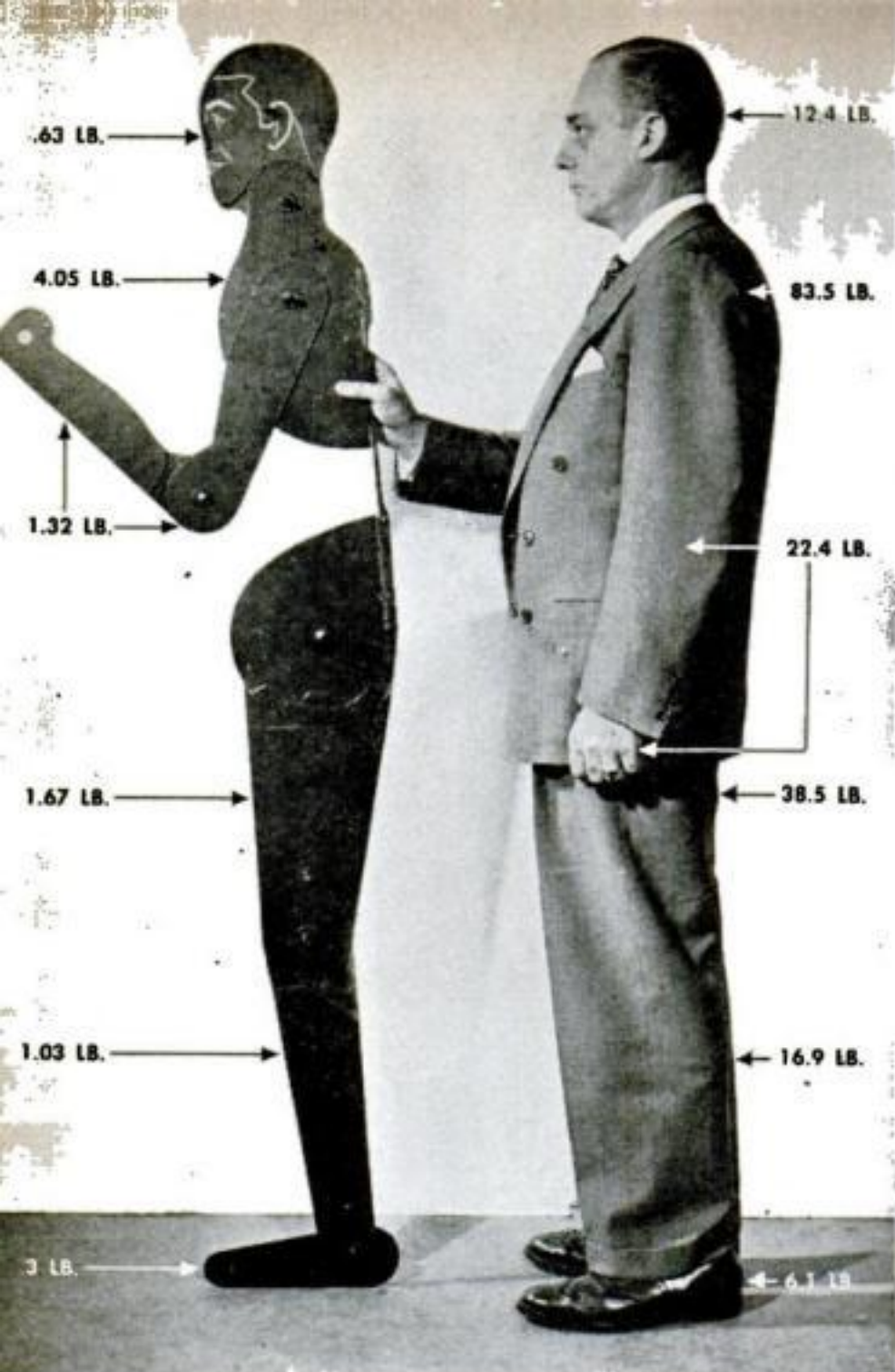
Death Seat Safer

ratories in Buffalo, N. Y., for example, the Thin Man is teaching scientists how to cheat Death by building safety right in the car.

The Thin Man is a jointed full-size sheet-aluminum figure of a man. He rides the death seat in a speeding "car" that never travels more than a few feet. The Thin Man is the brainchild of Edward R. Dye, chief of the laboratory's Development Division. Although he tips the scales at only 9 lb.—just 1/20 the weight of the 180-lb. man he represents—the various parts of his body are so weighted that they are not only in proportion to those of the human body, but have the same relative centers of gravity. The Thin Man even has a flexible backbone

in the form of a carefully calculated dural spine, as well as joints that can be tensed to provide relative muscular restraint and instinctive pre-collision bracing.

The Thin Man's car or cockpit is a horizontal, two-dimensional affair that rides on two rails mounted on the laboratory floor. In use, with the Thin Man in place on the seat, it is snapped backward by long elastic cords (airplane shock cords) to simulate the rapid slowing down, or deceleration, experienced during a crash. This jerking of the car backward provides the same relative acceleration of the Thin Man with respect to the car as if a fast-moving car was stopped suddenly. For test purposes, it's easier to do



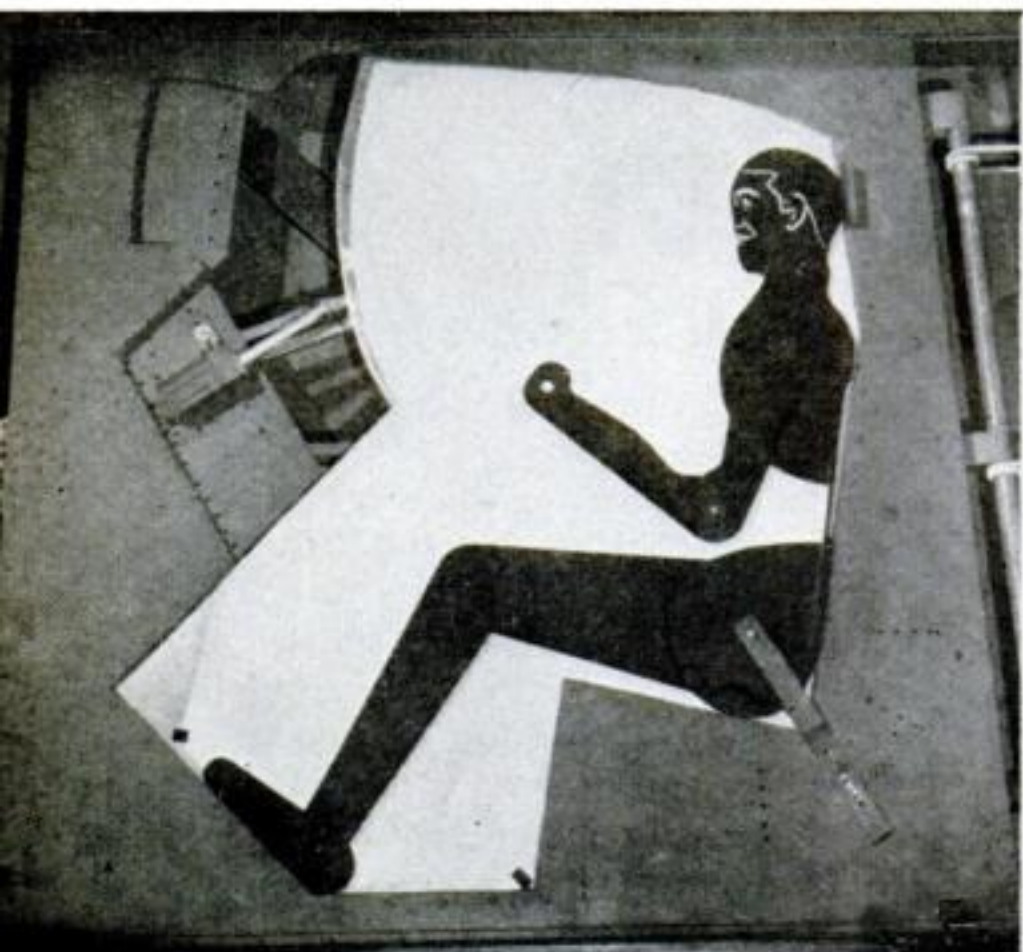
This Thin Man, standing with the author to show comparative weights of body parts, is helping Cornell Aeronautical Laboratory engineers learn how to make the death seat safer.

and takes less space on the laboratory floor.

During each test crash, which lasts but a fraction of a second, the paths of the Thin Man's head and the major joints of his body are automatically traced on a paper background. At the same time, an ingenious electric sparking device, wired to the various pencil leads that mark the paths, burns pin-point holes in the paper at uniform time intervals. These holes allow the velocities and accelerations of the various parts of the Thin Man's body to be calculated accurately. To evaluate each "crash," an energy-absorbing gauge measures the Thin Man's impact force. At the end of each test, the Thin Man provides experimenters with a vivid picture of just what would happen to the body and head of a 180-pound person under similar crash conditions.

Because cracked skulls are one of the major causes of crash casualties, most of the experimental work so far has been directed toward finding out just what happens to a car rider's head when a car smashes up.

According to the Thin Man, the body of a relaxed, unrestrained passenger in even a fairly minor crash moves upward and forward with considerable force. At a deceleration of 2 G—about the tops you can get if you tramp down as hard as you can on perfect brakes, with new tires, and on a high-friction road surface—the Thin Man is thrown forward violently. His head strikes



Seat belts, properly installed and adjusted, are one answer to the problem of greater car safety. Here, seat belt in place, the Thin Man sits in his car before the test.



In 2G crash, the Thin Man's head, thanks to seat belt, strikes dashboard with a scale impact of 400 in.-lb.—a good bump, but probably not enough to crack skull or cause death.

the upper front corner of his cab with a force equivalent to 1,000 inch-pounds for a 180-pound man. Few skulls can withstand an impact, against something hard, of more than 600 inch-pounds!

At a deceleration of 4G or more, not even a strong man can brace himself sufficiently to ease the impact materially. As researcher Dye puts it, "Trying to tense yourself against a 4G crash would be like trying to do push-ups with three other fellows sitting on your back."

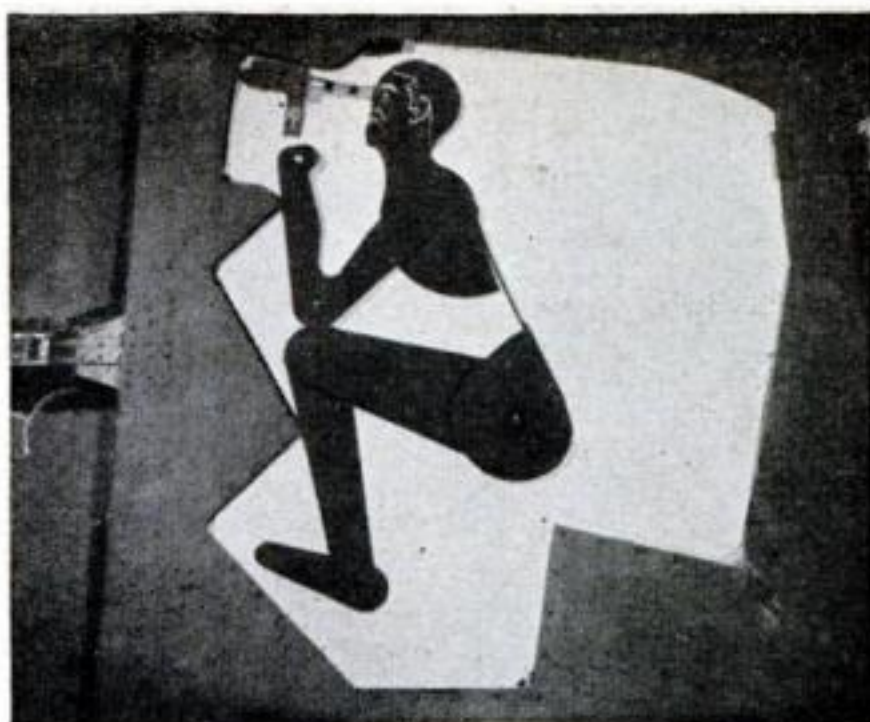
Tests with the Thin Man show that at a deceleration of 5G, which is the minimum in a bad car smash-up, the head of a 180-lb. man, not tensed for the crash, will hit in the vicinity of the top of the windshield frame with a skull-splitting impact of about 3,800 inch-pounds!

One obvious answer to the problem is the use of some sort of body-restraining device, such as a seat belt. However, experiments with the Thin Man have shown that not just any belt will do. It must be properly designed and properly adjusted. Tests indicate that it should be mounted at an angle of 60° from the horizontal and be adjusted to allow 3 inches of hip movement. When the Thin Man made a 2G crash wearing such a safety belt, his head hit with an impact equivalent to only 400 inch-pounds for a 180-pound man—compared to 1,000 inch-pounds without the strap.

How to Make Cars Safer

Because of his experiments with his Thin Man, Edward Dye has many suggestions about what could be done to increase automobile safety. First of all, the public—and that means you and me—must encourage automotive designers and engineers to build safety into their cars. We can do this by *not* demanding useless frills and living-room comforts on our Sunday-afternoon drives. The more complicated a car interior becomes—the more gadgets it boasts—the more dangerous it becomes. Such things as radio knobs, ornamental door handles, defrosting fans, spotlight handles, and trick sun shades may be handy accessories, but they can become lethal weapons in a smash-up.

All possible head-impact surfaces should be smooth. Dashboards should be covered with a crushable padding material at least 1 inch thick. Padding should not be an energy-storing material like rubber, but an energy-absorbing material like polystyrene foam, balsa wood, or any similar cellular



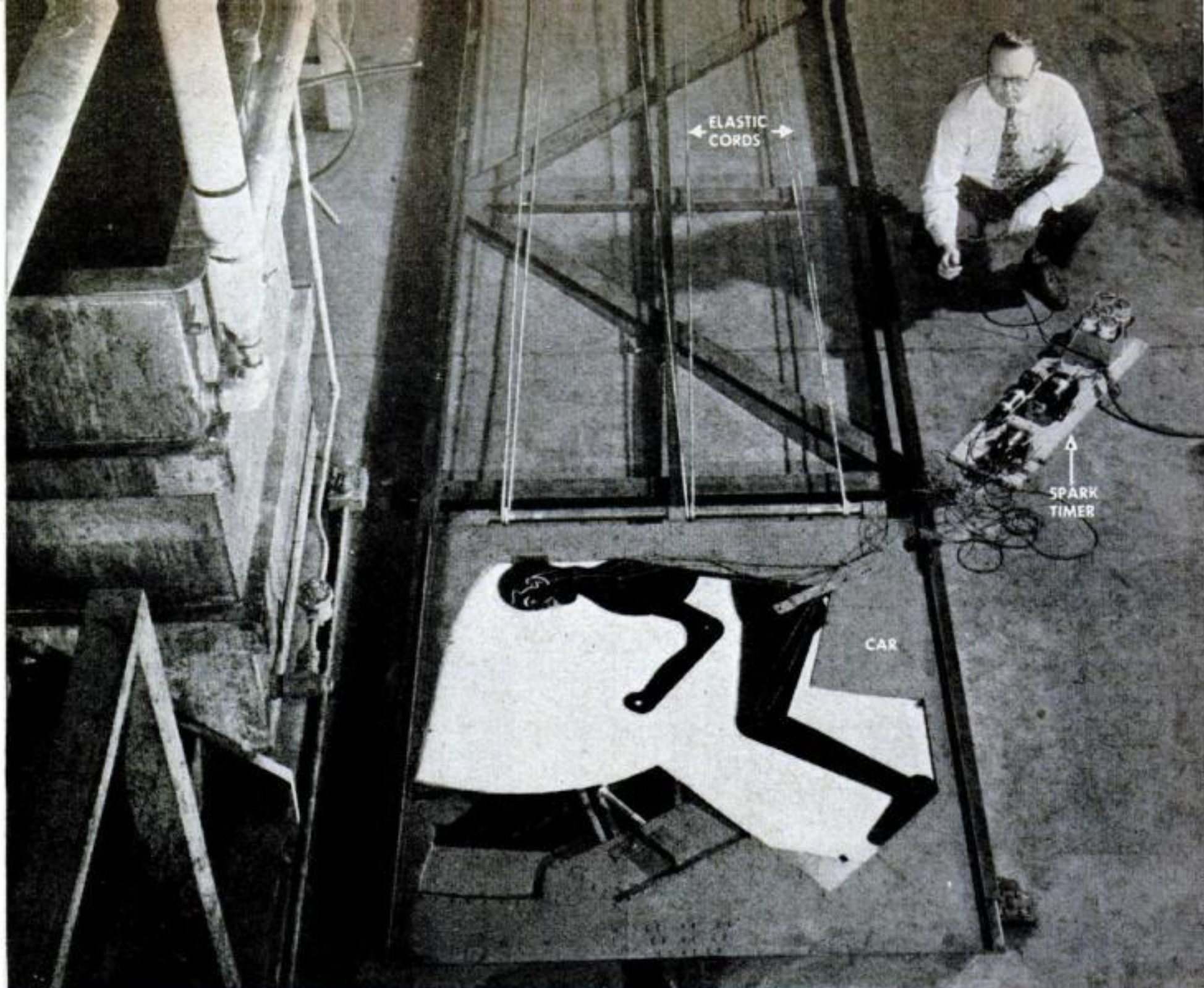
Without seat belt in 2G crash—deceleration obtained in quickest brake stop you can make under perfect conditions—Thin Man's head hits hard enough to bash in skull of a 180-lb. man.



In 4G crash, without seat belt, Thin Man lands in almost same place, but hits harder. At deceleration of 4G, easily possible in a collision, even strong man can't brace himself effectively.



Belt and shoulder harness provide the best protection in a crash. This is how the Thin Man ended up after a simulated 4G crash. No injuries except perhaps a few bruised toes.



Catapulting car used in the Cornell Aeronautical Laboratory tests. When release is triggered, elastic cords jerk car back. Effect is to provide desired deceleration, though it is actually ac-

celeration. Test lasts only fraction of a second, but shows what would happen to human body in crash. Made of sheet metal, Thin Man is crashproof in the laboratory trials.

material that crushes under a blow and either does not recover or recovers slowly. Ordinary live rubber is not recommended because it stores the energy of a blow and throws the head backward. Along this line, however, several rubber companies are experimenting with a slow-recovering rubber that will absorb the force of a blow and return to its original shape over a period of time.

Some kind of body restraint should also be provided. This can be in the form of seat belts and shoulder harnesses having a breaking strength better than 4,000 pounds, or cushioned body-control panels that can be pulled out to restrain the passengers in the front seat and be pulled down from the back of the front seat to restrain the passengers in the rear seat. The latter could be designed to yield a foot or so under a uniform force of about 4,000 pounds.

Still another form of safe body restraint could be obtained by placing as many seats as possible so that they face the rear. Any forces due to a crash then would be distributed evenly over the backs of the passengers.

In the driver's seat, the steering wheel is, paradoxically, both a hazard and a protection. It is the cause of most driver injuries. At the same time, its protection is seemingly responsible for the lower fatality rate in the left front as compared to the right front seat. In a bad crash, the driver may get serious chest injuries from the wheel, but the person alongside may be killed by smashing his skull on the dash or windshield.

Dye and his Cornell associates have two thoughts about preventing wheel injuries. One is to eliminate the steering wheel entirely, substituting steering levers that would control a hydraulic steering system. The

other is to provide a steering post designed to yield under impact loads of 500 pounds or more. This could be accomplished through the use of shear pins that would allow the telescoping steering column to collapse. This and other design ideas are shown in the drawings on the following two pages.

Since the force of a crash is equal to the kinetic energy ($\frac{\text{mass} \times \text{velocity}^2}{2}$) di-

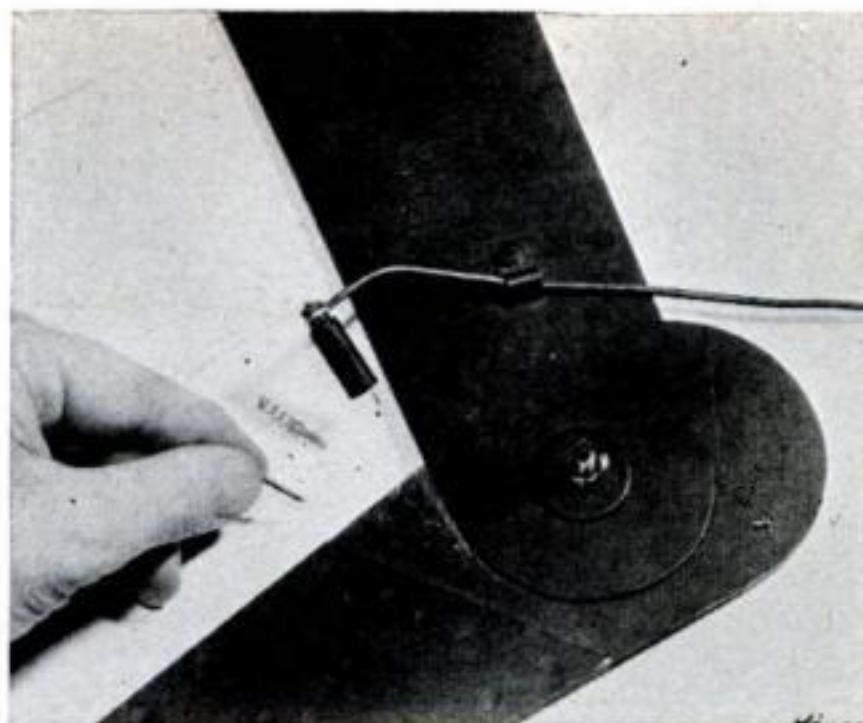
vided by the distance traveled during the period of deceleration, the Thin Man experimenters recommend that, for maximum safety, an automobile should be designed to have the major portion of its weight ahead of the passenger compartment, and that the structure between the passengers and the front of the car be designed to crumple progressively. This would *increase* the distance over which the crash deceleration is accomplished and therefore *decrease* the crash force. Also, the front structure should be so planned and fabricated that it will collapse out, rather than in, to prevent passengers from being pinned inside.

When You See a Crash Coming

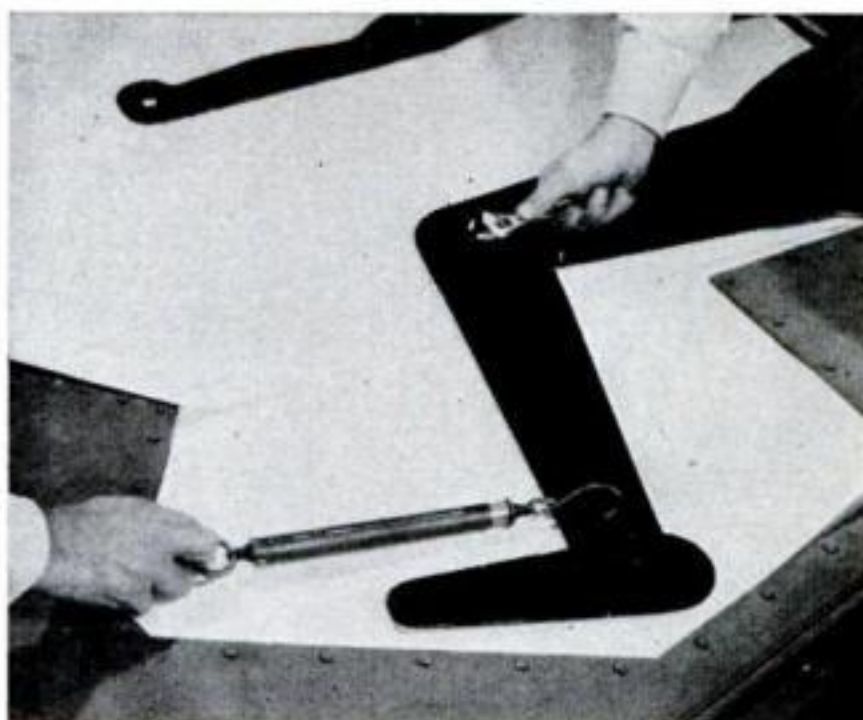
From the Thin Man's many bloodless laboratory crashes have come some basic "what-to-do-if-you-see-a-crash-coming" suggestions. If followed, they can mean the difference between your life and your death.

First of all, don't do the instinctive thing. Don't throw your arms up to protect your face. The bulk of your up-raised arms will only add to the weight of the upper part of your body and increase the force of the hammer blow when your head and arms hit the windshield or the dash. Instead, cradle your head in your arms to cushion it and press it firmly against some solid forward structure. If you are in the back seat, this will mean the back portion of the front seat. If you are in the one next to the driver, it will mean pressing your arm-cushioned head against the smooth part of the dashboard. The driver, naturally, should try to control his car as long as possible. However, the steering wheel can provide him with some support if, at the last moment, he cushions his head with a forearm and presses it against the wheel.

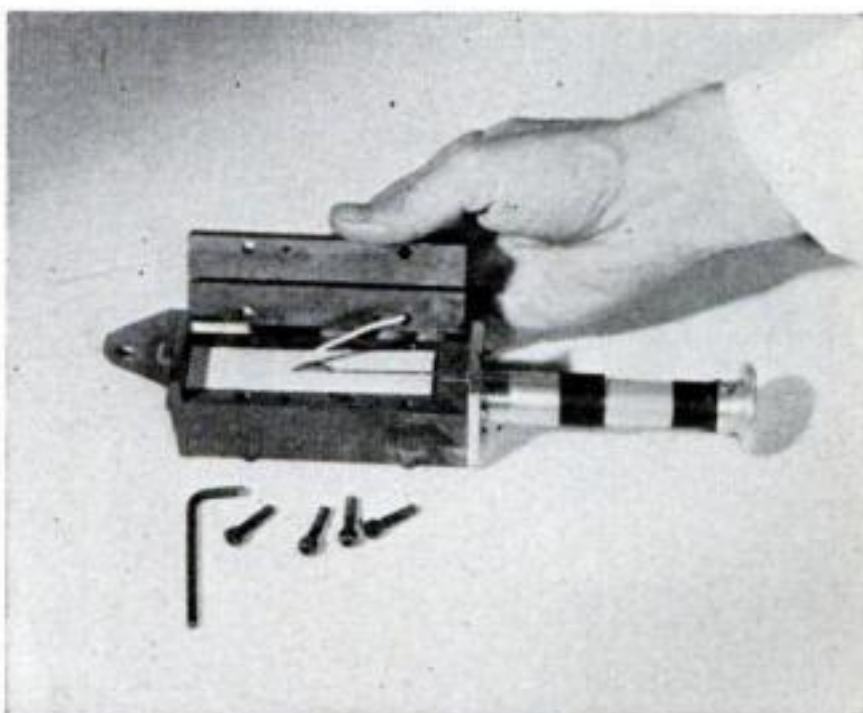
If you follow the advice of the Thin Man, however, you'll use seat belts. Get them from an aircraft-belt manufacturer, and *insist* that every passenger use them if he wants to ride.



Pencil leads and an electrical sparking system provide data in crash tests. Leads trace paths of joints on paper background, while sparks puncture paper to provide timing marks.



Thin Man's muscles can be "flexed" to simulate any degree of human tenseness by adjusting tension bolts at joints with the aid of a wrench and a sensitive spring scale.

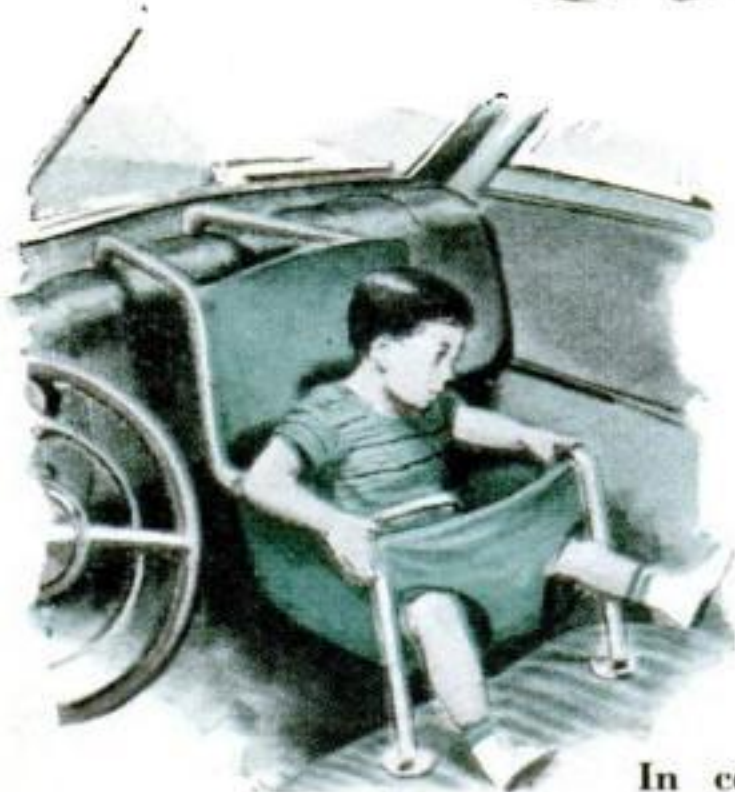


Force of impact of Thin Man's head is measured by gauge. Force pushes blades to cut cardboard inserts. Depth of cut indicates energy of blow. [Continued on next page.]

How Cars Can Be Made Safer



Good crash safety could be obtained, suggests Cornell's Edward Dye, if all seats except the driver's faced the rear. Driver could use a body-restraining device.



Youngsters could ride comfortably and safely in a rearward-facing baby seat attached securely to the dashboard and having feet resting on the front seat. When not in use, it could be removed and stored.



In conventional cars, best protection against injury in crashes is a well-designed seat belt and shoulder harness similar to those recommended for use by airplane pilots. To be safe, the web straps should have a minimum breaking strength of at least 4,000 lb. and be anchored accordingly.

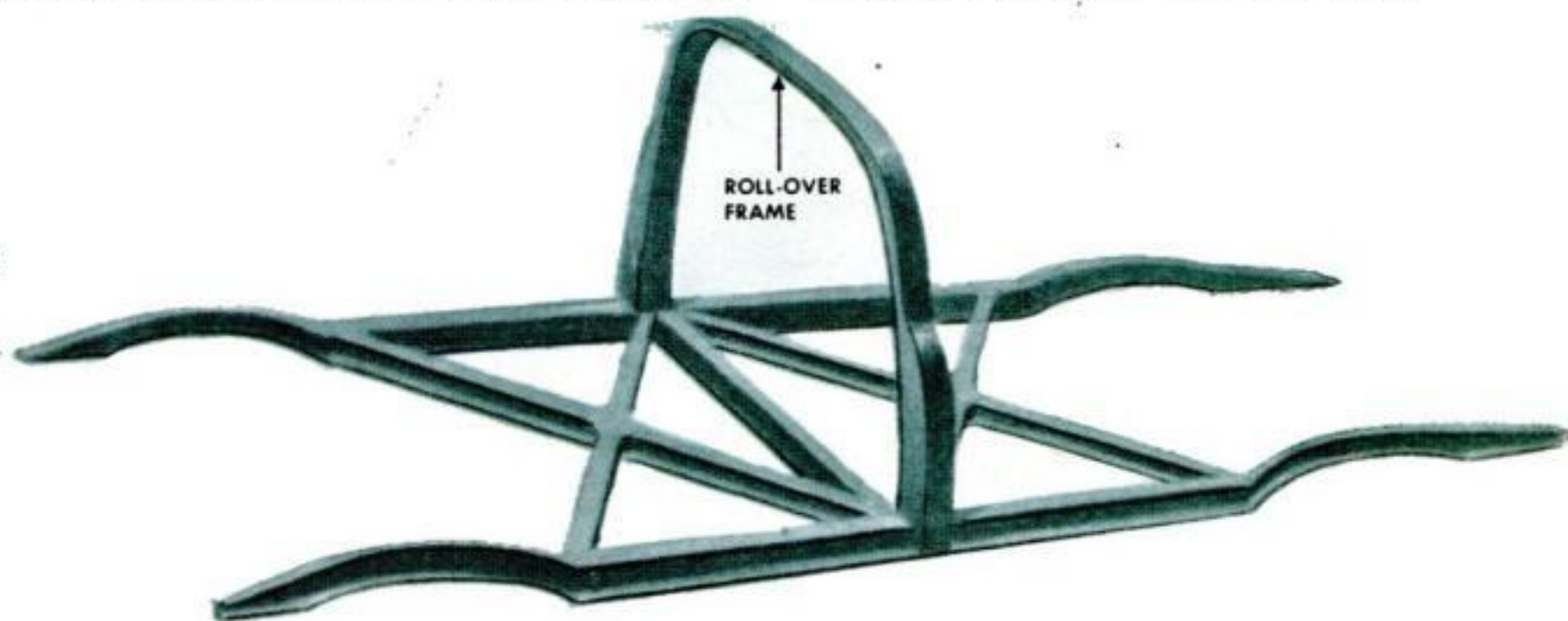
Next best is a seat belt without the shoulder harness. It should be installed so it meets the body at an angle of 60° from the horizontal, and should be adjusted to allow about 3 in. of hip movement. Head may still strike dash, but without dangerous body momentum behind it.



Steering levers could replace the steering wheel and eliminate the major cause of injury to drivers. Driver could be restrained by an energy-absorbing panel pulled out from dash.

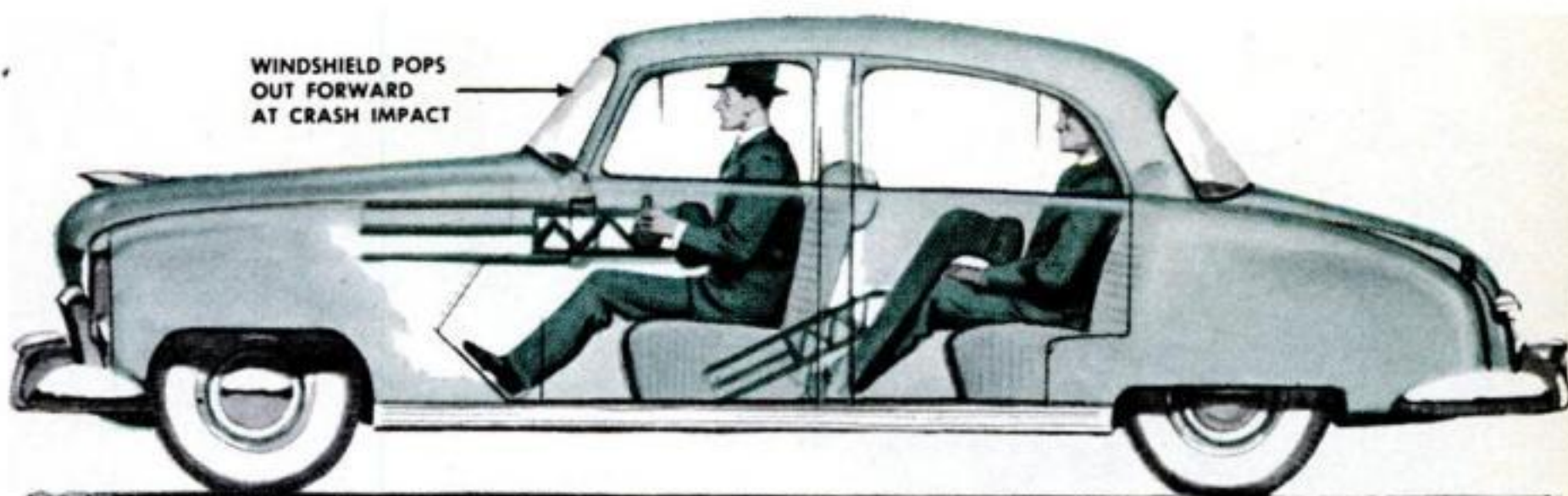


Conventional steering wheel could be made safer by providing it with shear pins designed to yield under an impact load of 500 lb. Wheel would give gradually to absorb shock.



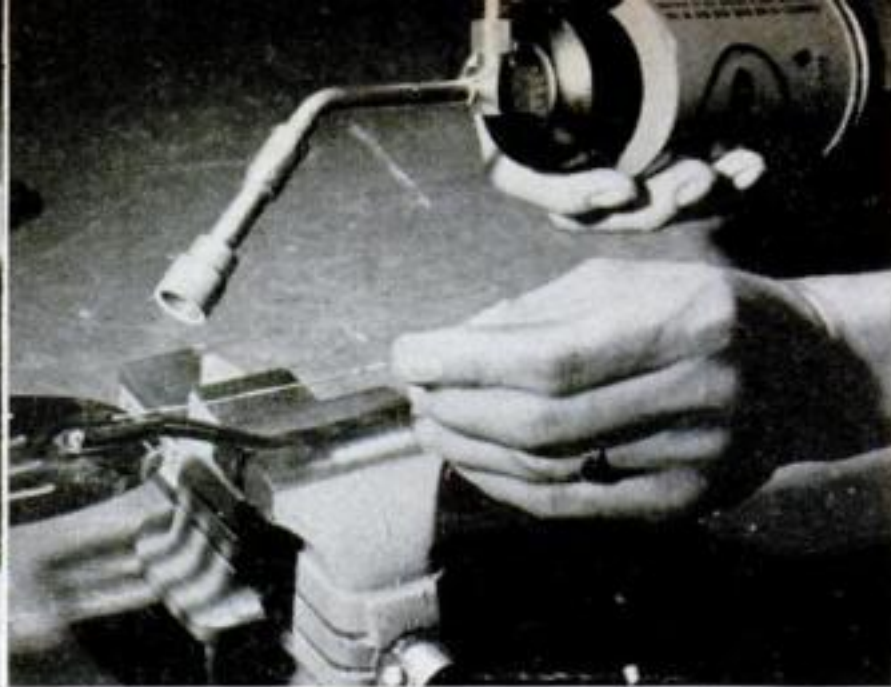
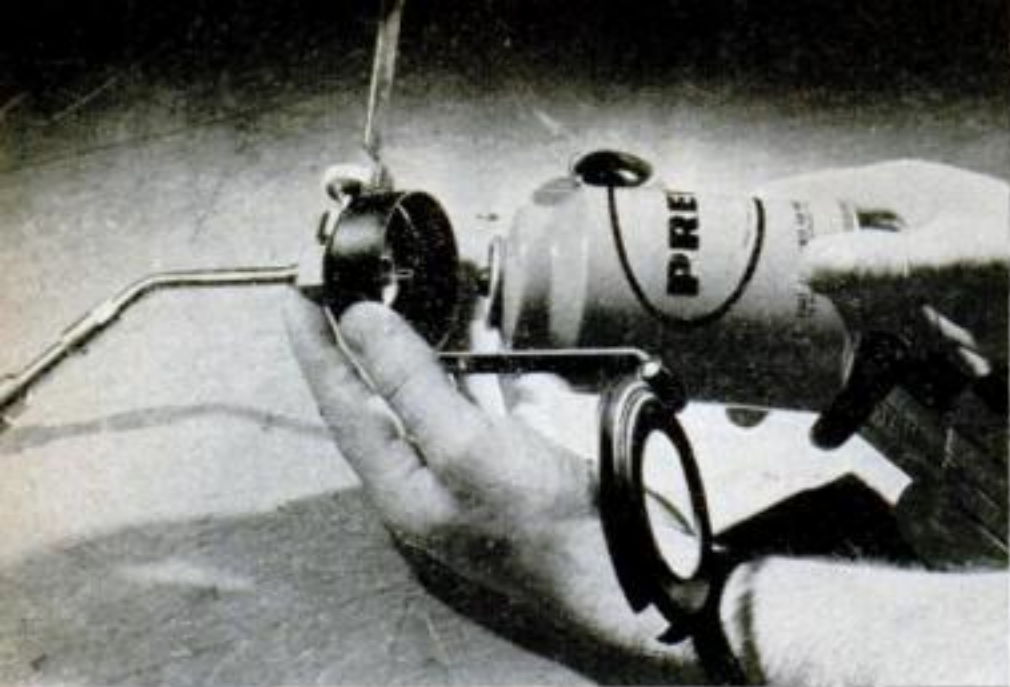
Heavier car frames and a built-in roll-over frame would increase the safety factor in car accidents. Side frames could be strengthened to provide adequate protection in case of side-

swiping smash-ups. If the front ends of autos were built to crumple progressively, and collapse out, rather than in, there would be less chance of injury in bad car crashes.



Padded body-control panels for both front and rear seats plus steering levers would provide safety for driver as well as passengers. Individual energy-absorbing panels could pull out

from dash for driver and death-seat passenger, while section of the back of the front seat could pull down to restrain the passengers in the rear seat in the event of a crash.



Cartridges Load Blowtorch

A THROWAWAY can feeds the fuel into this new pumpless blowtorch. When one can is empty, you replace it with a full one, turn a valve, and the burner lights instantly at the touch of a match. Called Prepo, the torch consists of a burner and valve assembly that clamps over the top of the fuel con-

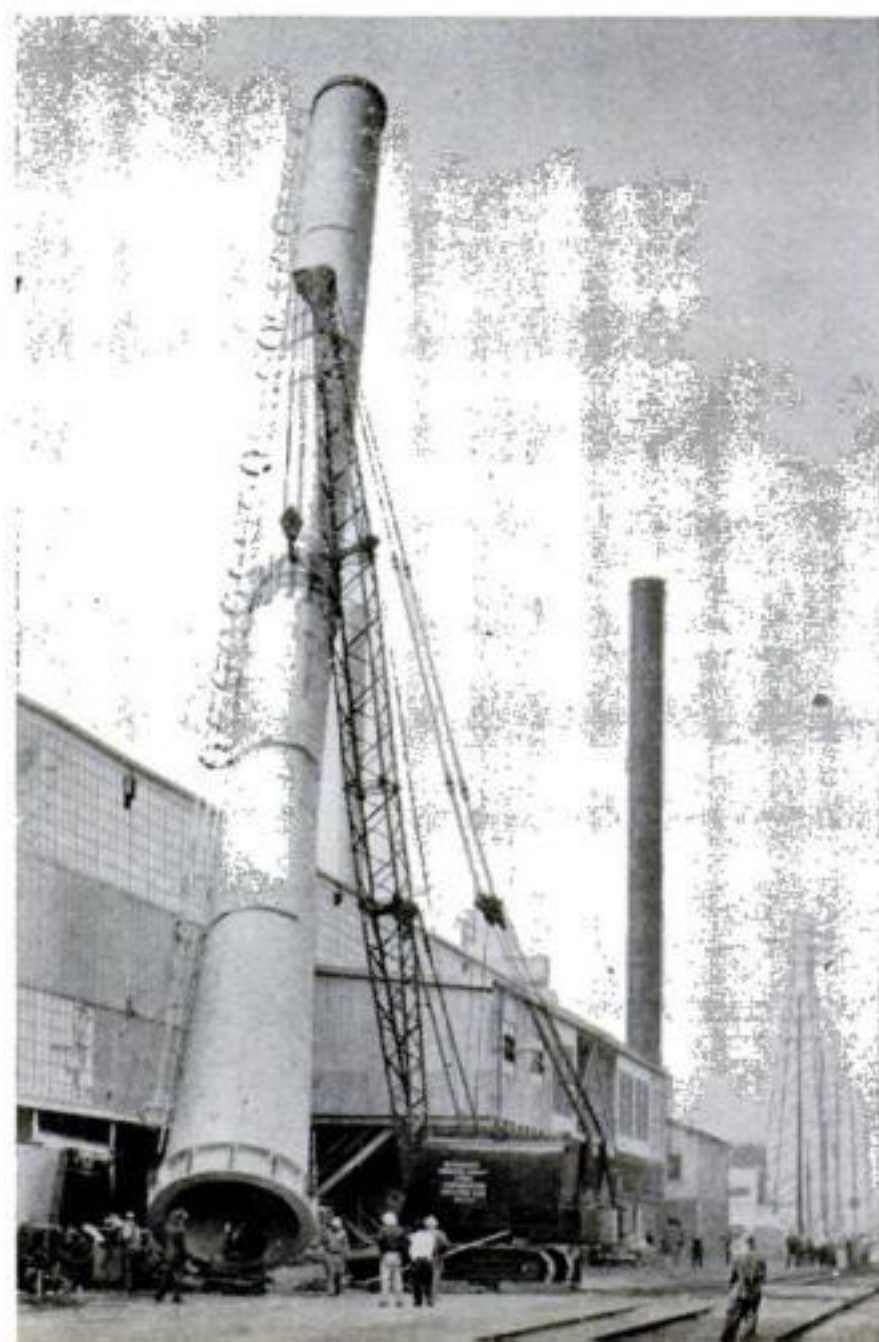
tainer (left above). The fuel, a highly volatile compound of hydrocarbons, builds up pressure inside the can to force vapor out through the burner. Burning with a clean, blue flame at 2,200° F., the torch handles a wide variety of jobs, including silver soldering (right above). Made by Pressure Products Corp., Chicago, it sells for \$5.95. Refill cans, costing 89¢, last five hours.

Powered Broom Sweeps Lawn

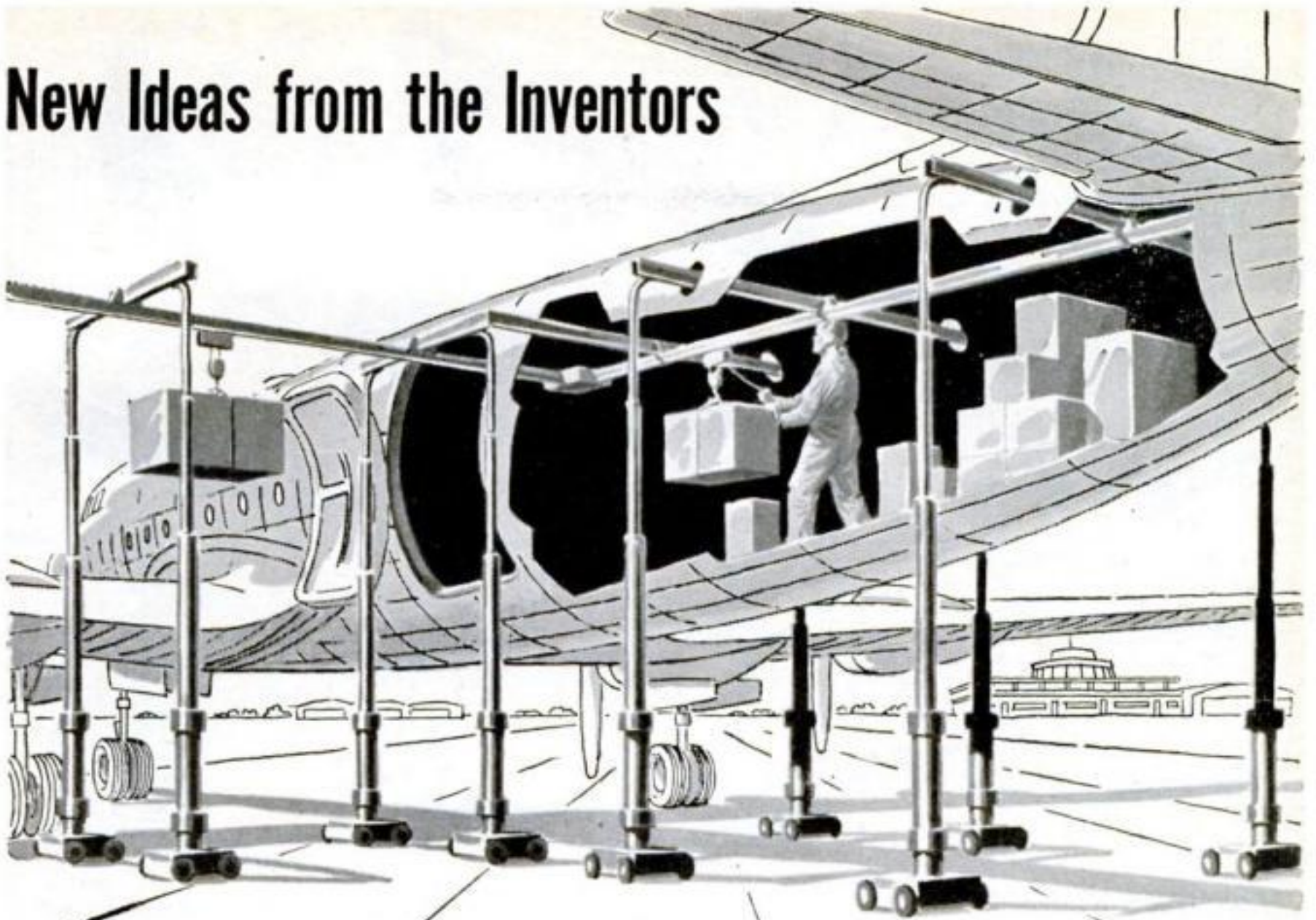
You can sweep your lawn as easily as you do your floors with the motorized lawn sweeper shown below. Powered by a single-cylinder, four-cycle gasoline engine, it has a 28-inch-long rotating brush that picks up leaves, grass cuttings, stones, paper, and other trash and tosses them back into a 10-bushel basket. Made by the Parker Pattern and Foundry Co., Springfield, Ohio, the sweeper rolls on dual rubber tires.

Smokestack Gets Big Lift

Most smokestacks are built piece by piece from the ground up, but the giant structure below was assembled in one piece on the ground, then lifted by a crane to its vertical position on a concrete foundation. Once standing, the 26-ton steel stack was lined with 124 tons of fire brick and mortar. Built for the Los Angeles plant of the Bethlehem Pacific Coast Steel Corp., it carries hot gases 150 feet into the air.

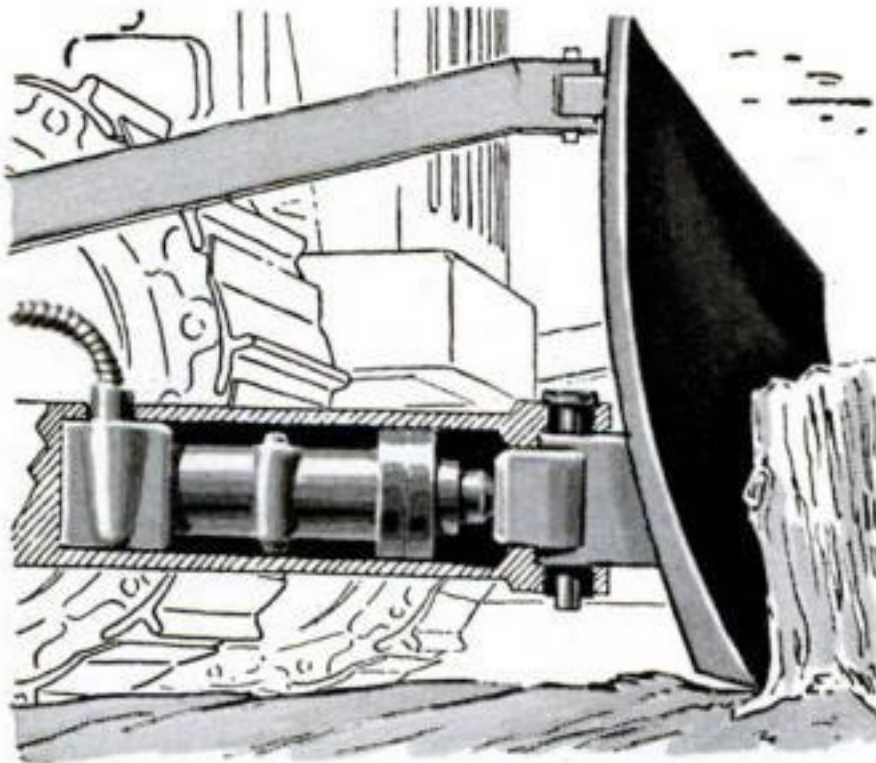


New Ideas from the Inventors

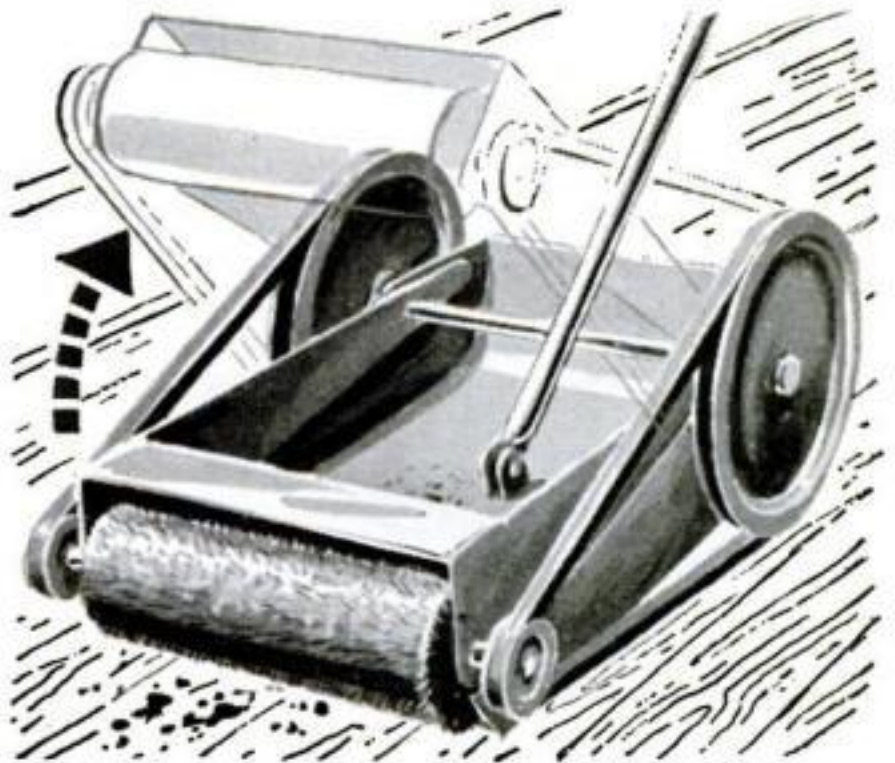


1 MONORAIL TO LOAD PLANES. A cargo plane could be loaded and unloaded quickly and easily with this take-down monorail system. Wheeled uprights would be moved into place to support the monorail

within the plane through openings in the fuselage. They would also hold the loading rail that leads through the plane's big loading door. Loading or unloading completed, the monorail system could be removed.



2 AIR HAMMER FOR DOZER BLADE. Stubborn stumps or boulders would be a pushover for a tractor equipped with a blade backed up by this air-hammer attachment. All the driver would have to do is turn a valve. Then the air hammer, by pounding the blade with rapid-fire blows, would help it work the obstruction loose.



3 DUSTPAN HAS OWN BRUSH. A cross between a dustpan and a carpet sweeper, this new cleaning tool is designed to eliminate stooping when sweeping up piles of dirt. Its rotary brush is belt-driven so that it turns rapidly when the pan is pushed forward. When the dustpan is dumped, the brush is easily raised out of the way.

Turn the page, please, for three more new ideas.

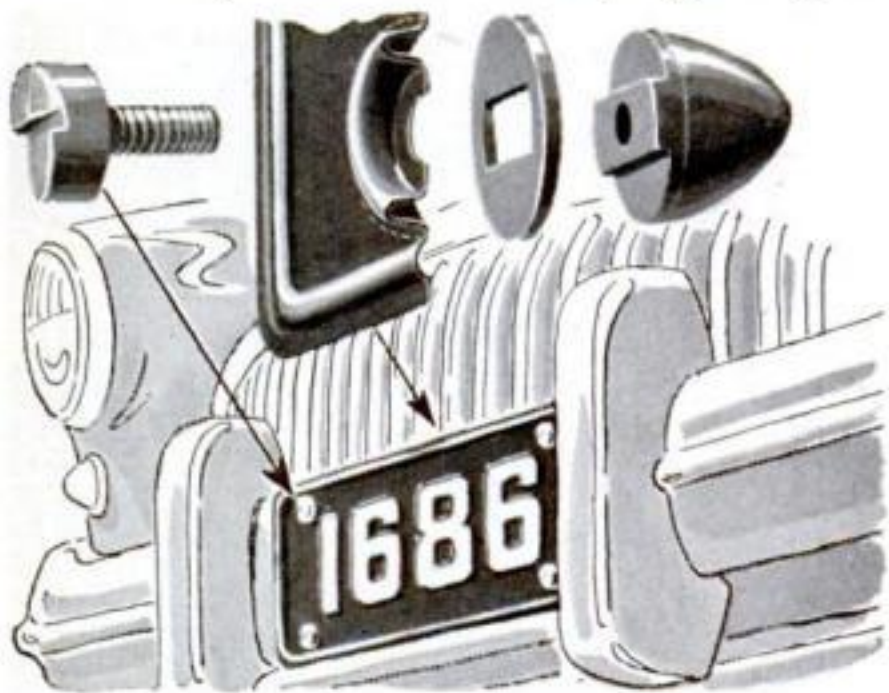
JULY 1950 91

MORE New Ideas from the Inventors

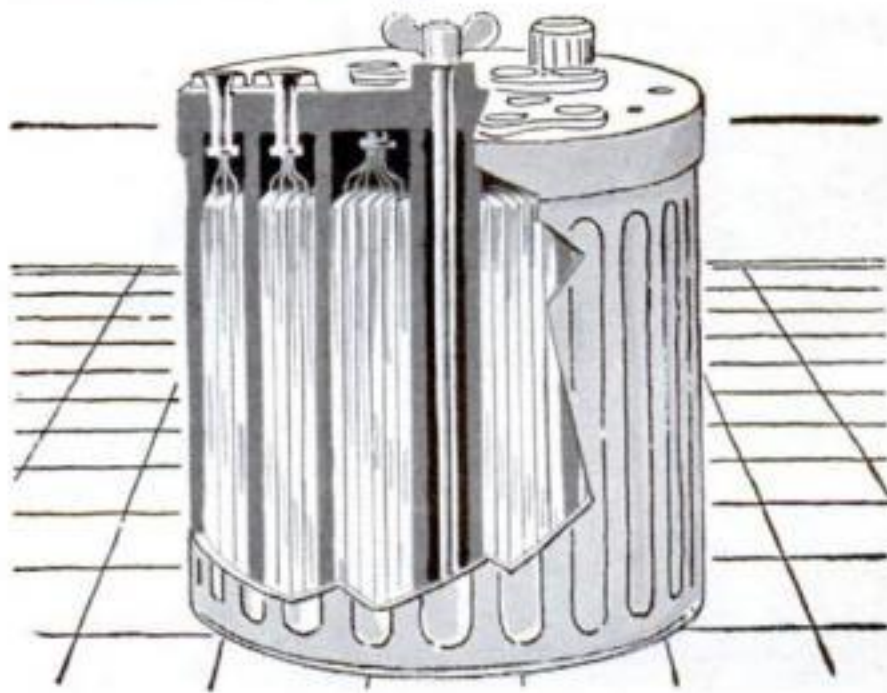


4 DEVICE SIMULATES SEAPLANE. You could have the thrills of piloting a real seaplane with this aquatic device. Designed for either amusement or training, it is driven by an underwater, gas-engine-

powered propeller. Conventional aircraft cockpit controls operate water rudder, ailerons, and elevators. By manipulating them the "plane" can be made to take off, bank, and land realistically.



5 TAG FOILS THIEVES. This license can be attached with a screwdriver, but must be destroyed to take it off. The bolts have one-way slots, can be tightened but not loosened. Deep embossing of the tearout disks shield the bolts so you can't grip them. Tapered, shouldered nuts give no wrench purchase. You remove the license by ripping it off, then squeeze the disks against the sides of the bolts with heavy pliers, and turn.



6 ROUND BATTERY SAVES SPACE. Three concentric cells nested together make a compact storage battery for autos and other vehicles. Cylindrical walls separate the three cells, and are so spaced that each cell has the same battery-acid capacity and cell-plate area. The cylindrical shape of the plates gives a larger area and therefore greater capacity than conventional rectangular plates.

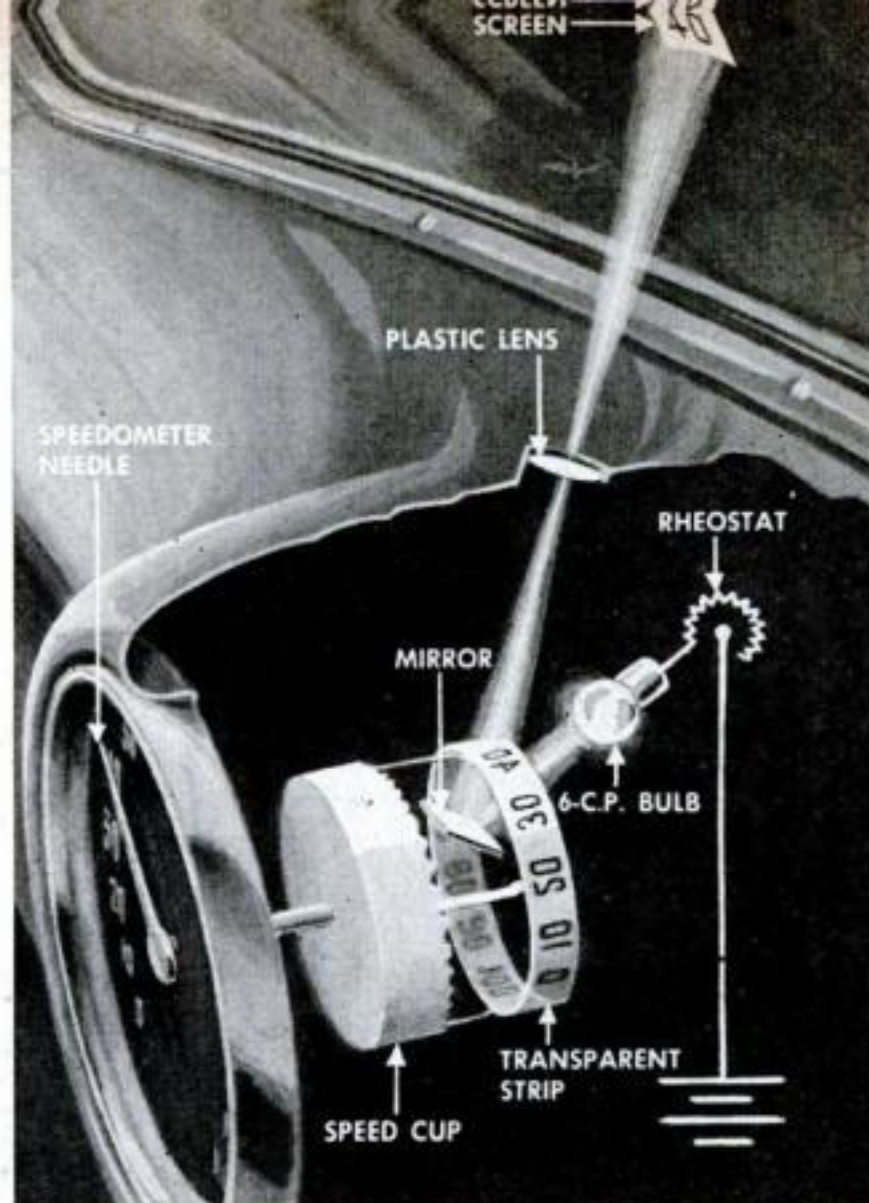
Patents on these inventions have been granted to: 1. G. Noville, Van Nuys, Calif.; 2. B. Alderman, Eugene, Ore.; 3. V. Filonowicz, Detroit, Mich.; 4. E. Link, Binghamton, N. Y.; 5. W. Martin, Tampa, Fla.; 6. J. Rupp, Williamsville, N. Y.

Speed Screened On Windshield

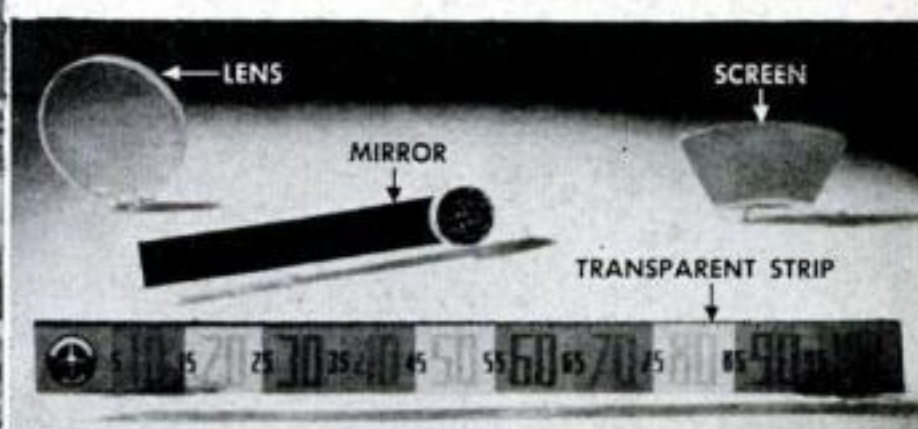
YOU don't have to take your eyes off the road and check your speedometer with this Glowmeter. Attached to any standard speedometer, it shines an image of your speed right on the windshield. As the speedometer shaft turns, moving the needle, it also rotates a drum-mounted transparent strip of numbers, synchronized with the speedometer-face numbers. A light reflected through the strip by a mirror projects an image of the numbers through a lens in the dash cowl, and onto a tiny metal screen fixed to the windshield.



Arrow points to tiny screen on which speed is projected. Image changes color (blue, red, yellow) with every 10-m.p.h. variation in speed.



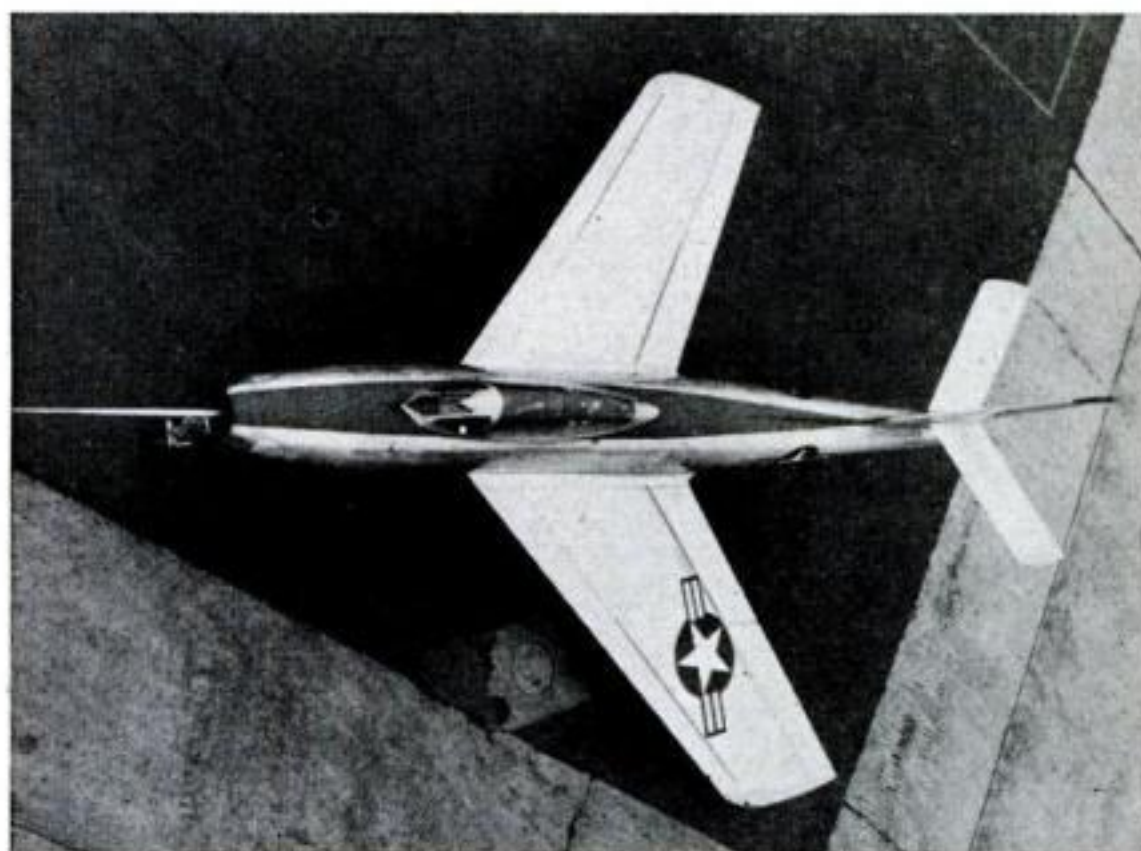
Cutaway drawing shows how speed figure is projected on dime-size windshield screen. Glowmeter Co., Buffalo, N. Y., developed the device.

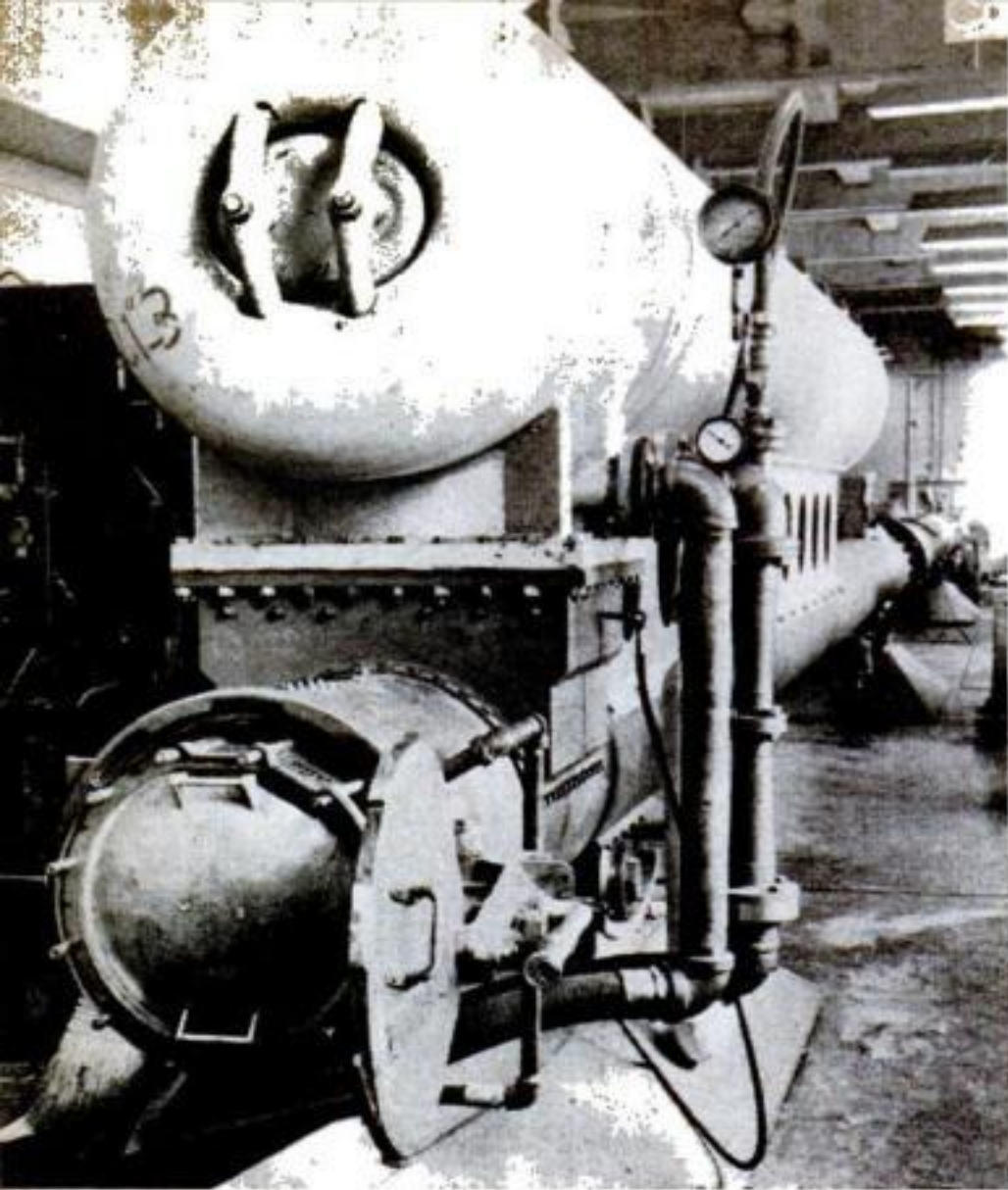


Main parts of the Glowmeter are shown actual size above. At left of mirror is bracket that holds it in place. Plastic strip is multicolored.

Thunderjet Tries New Swept Wings

SWEPT-BACK wings and a new tail assembly give a sleek look to the revamped Republic Thunderjet shown at right. Inside there's a more powerful J-35 turbojet engine, and greater fuel capacity. Added up, these innovations will enable the new Air Force fighter, the YF-96A, to fly faster, farther, and higher than its 600-m.p.h. predecessor. It also can carry more external bombs, rockets, or guided missiles.



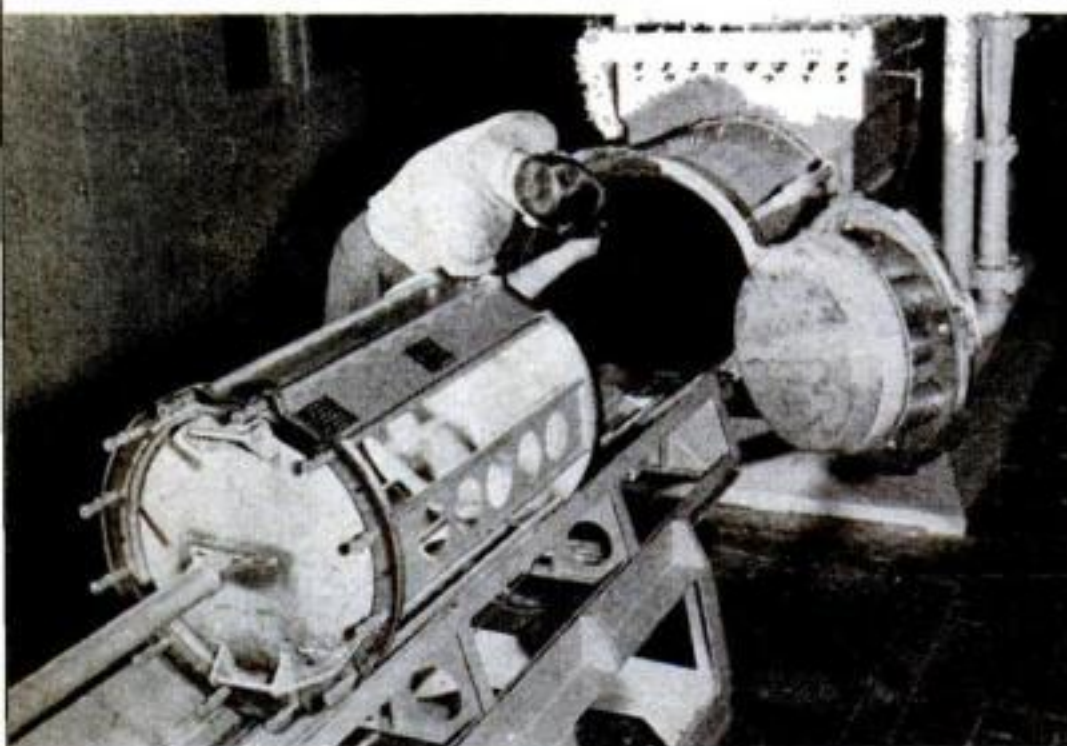


Muzzle view of Navy's giant air gun. Big cylinder on top of tube is muzzle chamber. It provides extra air volume in front of piston, acts as cushion to help cut down oscillation.

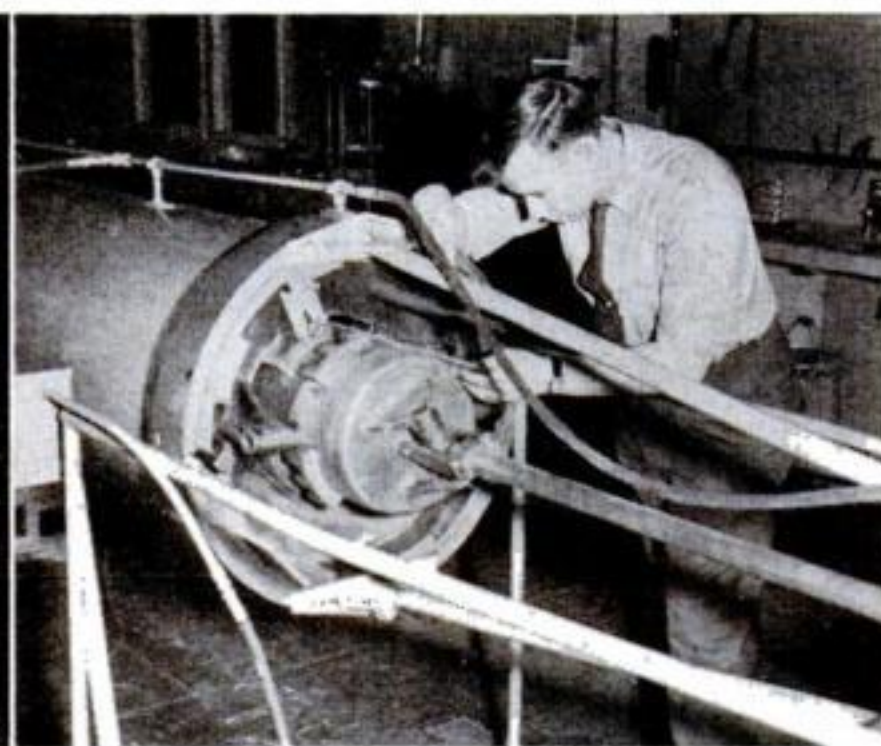
Giant Air Gun Jolt-Tests Fuses

THIS king-size air rifle is used by the U. S. Navy to test shock effects on mine and torpedo fuses. The Navy wants to know whether a mine sown from a plane at 30,000 feet will still function after it has hit the water. So it simulates the shock by firing the fuse-mechanism down this 21-inch-diameter, 93-foot-long steel tube.

The device being tested is mounted in a cylindrical frame that serves as piston, or "bullet," for the gun. The piston is loaded into the muzzle and pumped by low-pressure air to the breech end. Here it engages a complicated release mechanism, which locks it in place until the right amount of air pressure is built up behind it. Then a hydraulic trigger releases the piston and it flies down the barrel. It builds up air pressure in front of it which finally pushes it back toward the breech. It oscillates in this way until the available energy is used up in friction or trapped in a muzzle chamber.

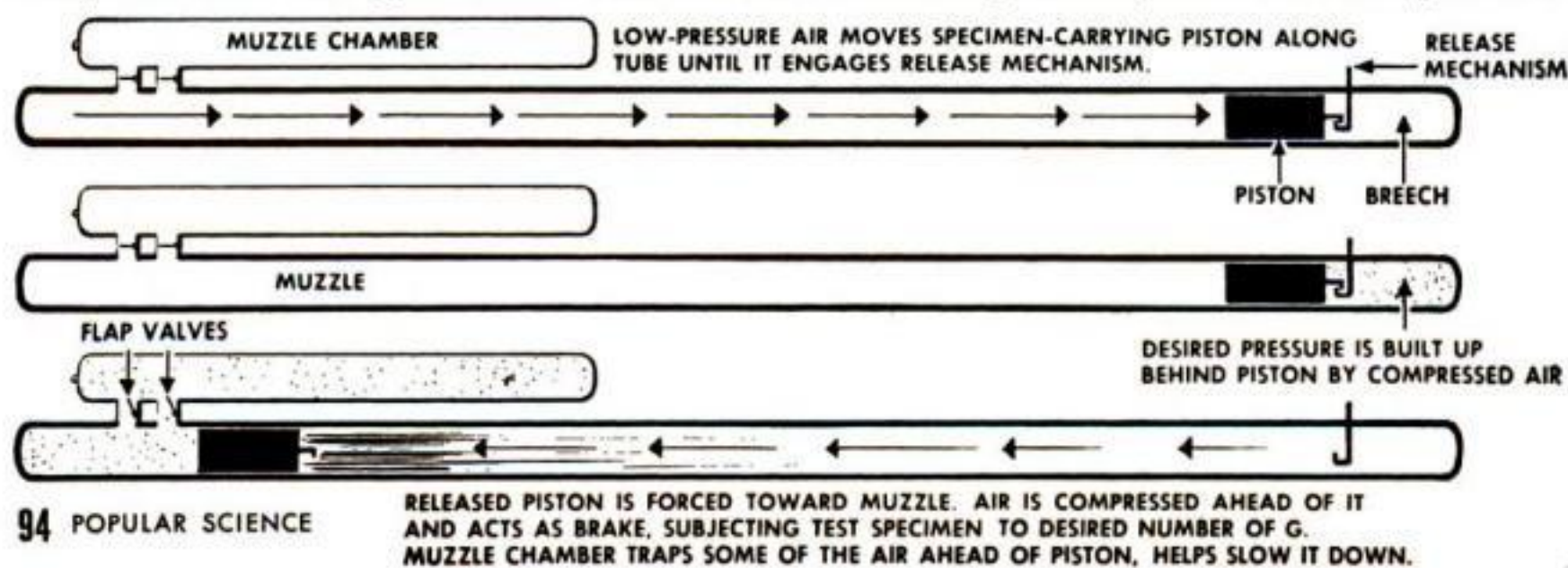


Getting muzzle ready to receive piston. Key-way on piston fits multiple-contact electrical strip running length of barrel. This allows readings while the piston is in motion.



Breech view of gun. Hydraulic device locks piston into place until desired air pressure is built up behind it. Amount of pressure depends on number of G device is required to stand.

Diagrams show how gun works. Gun can exert forces equal to 2,750 G on a five-pound load.





Darning Needle Dwarfs World's Smallest Screws

THE picture above is a photomicrograph of the world's smallest mass-produced screws. Perfectly threaded and slotted, they are so tiny that they can almost pass through the eye of the darning needle shown in the foreground. It would take a million

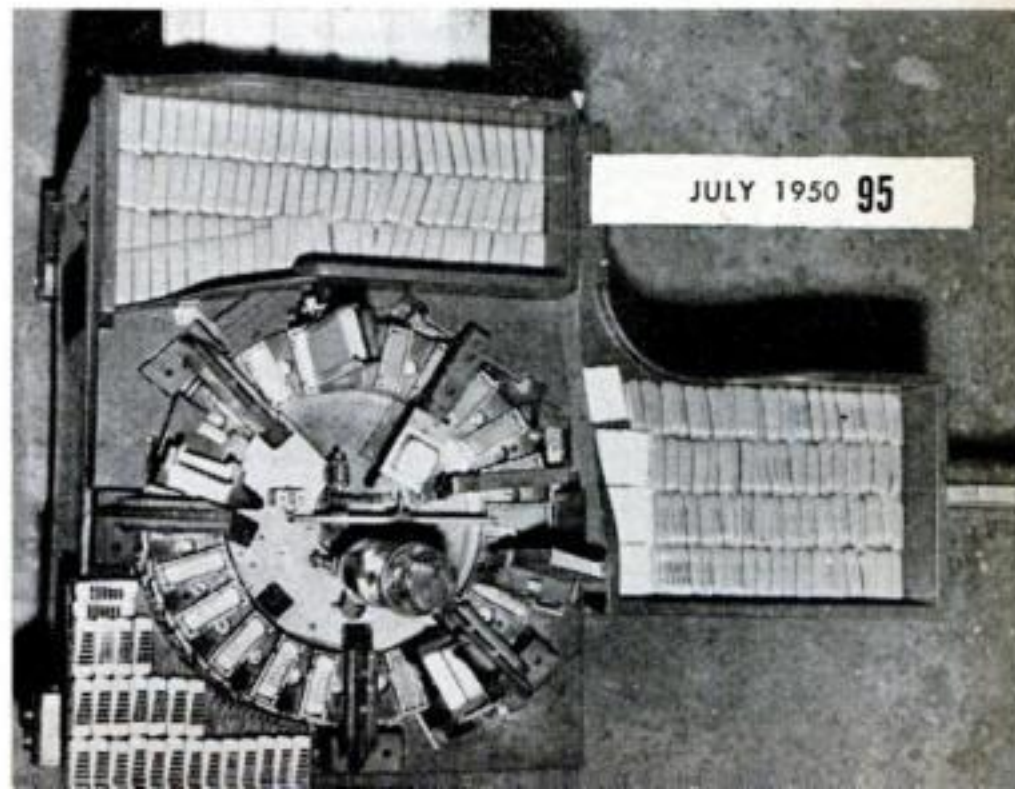
of them to tip the scale at one pound. They are used to adjust the delicate balance wheels in precision watches and military timing instruments. The microscopic screws and the machines that make them were developed by the Elgin National Watch Co.

Machine Makes Ice Cubes Fast

THIS new ice-cube dispenser, invented by comedian Lou Costello, makes 360 cubes in 90 minutes. Riding on a conveyer belt, water-filled steel trays pass through the freezing unit, and then to the dispensing outlet. Pressing a glass down on a trigger release sends the cubes, one at a time, sliding down a chute and into the glass. Called Serv-Ice, the dispenser was developed for use by hotels, restaurants, bars, and hospitals.

Wheel Assembles Harmonicas

FIRST of its type, the automatic assembly wheel below turns out 3,600 harmonicas an hour—a production increase of 2,800 percent over the previous rate of 130 an hour. As the wheel revolves, the five parts of the all-plastic harmonicas drop from hoppers, one by one, building up a sandwich, while glue is squirted in to “weld” them together. The machine was developed by the Magnus Harmonica Corp., of Newark, N. J.





Atomic Air Wardens'

While firemen of the Oak Ridge National Laboratory fight smoke and flame in mock fire,

Geigermen lead fire fighters through "hot" area after mock A-bomb blasts buildings in realistic training test.

"The real strength of America is not in bombs or planes, but in the resourcefulness of its people. . . . Americans who know how to handle cameras can easily learn to handle Geiger counters."

—Murray S. Levine,

formerly of Manhattan (A-bomb) Project, to Joint Congressional Committee on Atomic Energy.

By Michael Amrine

PS photos by the author on location

OAK RIDGE, TENN.

MY assignment was to cover a fire. To a reporter who has eyewitnessed some pretty spectacular displays of flame and smoke, from the Kansas City stockyards to the New Orleans waterfront, this *looked* like any ordinary one-alarm blaze in a frame shack on the edge of town.

But I had never covered a fire like this one.

I stood on a small rise of ground just two miles from the Oak Ridge nuclear reactor that manufactures U-235 for the atomic bomb. And my ears were cocked for something more significant than the sound of crackling flames and screaming sirens—the barely audible buzz of the nearest Geiger counter.

For this sudden blaze, which destroyed a "communications center" and threatened nearby buildings, had burst out in an area already "hot" with radioactivity.

A Geiger squad of twenty men, wearing gas masks, and carrying instruments of half a dozen different types, were on the scene *before* the firemen. As the sirens spiraled down to a low whine and the pumpers lumbered to a halt in the muddy field, the Fire Chief reported to the leader of the Geiger squad.

That was the thing that struck me most vividly in contrast with other fires. The senior fire officer ordinarily has authority equaled only by the captain of a ship. Here, the Geiger captain, with a survey



First Workout

student air-raid wardens of the atomic age battle the even deadlier "heat" of radiation.

instrument in hand, went ahead as he led the Fire Chief off at a dead run to take a quick look at the terrain. The firemen could not do their jobs without checking with the Geigermen at every turn. They reminded me of Seeing Eye dogs. They were no more immune to radiation than you or I. But they had electronic eyes and ears which could see through smoke and feel radiation through several feet of earth.

What these white-clad Geigermen were learning may some day save your life, in your own city, if the human race should ever be so foolish as to wage an atomic war.

The fire was real, and the radiation was real, but it was all prearranged—the first public field exercise of the first class of radiation monitors trained for civil defense of America's cities. It constituted the final exam of a five-weeks course of instruction.

The burning "communications center," the "powerhouse," and the "waterworks" (which contained a tank of "hot" liquid) were one-story shacks designed to represent larger installations that may some day be atomic targets in your own back yard. The fire was "planted" by instructors from the

Students check equipment before entering contaminated area. Men wear white cotton gloves and gas masks. Instruments must be zeroed to normal background count of area.





The 20 students line up, led by the walkie-talkie operator and a battery of Geiger counters—the black boxes with the metal tubes. Geigers are good for detecting presence of radiation but give only rough idea of amount. The light-colored boxes are used for one-handed opera-

tion and more precise measurement. A man in second rank from rear has pistol-grip “cutie-pie”—with the black, oversize barrel—for gamma rays. At extreme left is fish-pole probe, which precisely measures high gamma radiation and indicates roughly the presence of beta radiation.

health physics training divisions of Oak Ridge Laboratory and Oak Ridge Institute. The 20 students were sent by the governors of 16 Southern and Midwestern states for the five-week basic training course, sponsored by the Atomic Energy Commission and the National Security Resources Board, an agency which reports directly to the White House. They were being taught not

only to know radiation but to train others.

This summer, NSRB is sponsoring two more of these courses for specially selected trainees at Brookhaven National Laboratory on Long Island and at the University of California at Los Angeles.

At Oak Ridge the 20 chemists, engineers, physicists—and one veterinarian and one short-wave radio operator—learned the

As fire dies out, monitor (center, below) moves in close for a reading. Concentration of 9,000 milliroentgens made this spot the hottest by far in entire area, due to radioactive paint

and buried radioactive cobalt. Next day, with the cobalt safely behind lead bricks, the charred timbers still gave off 100 mr per hour. Tolerance dose for the average man is 60 mr per day.

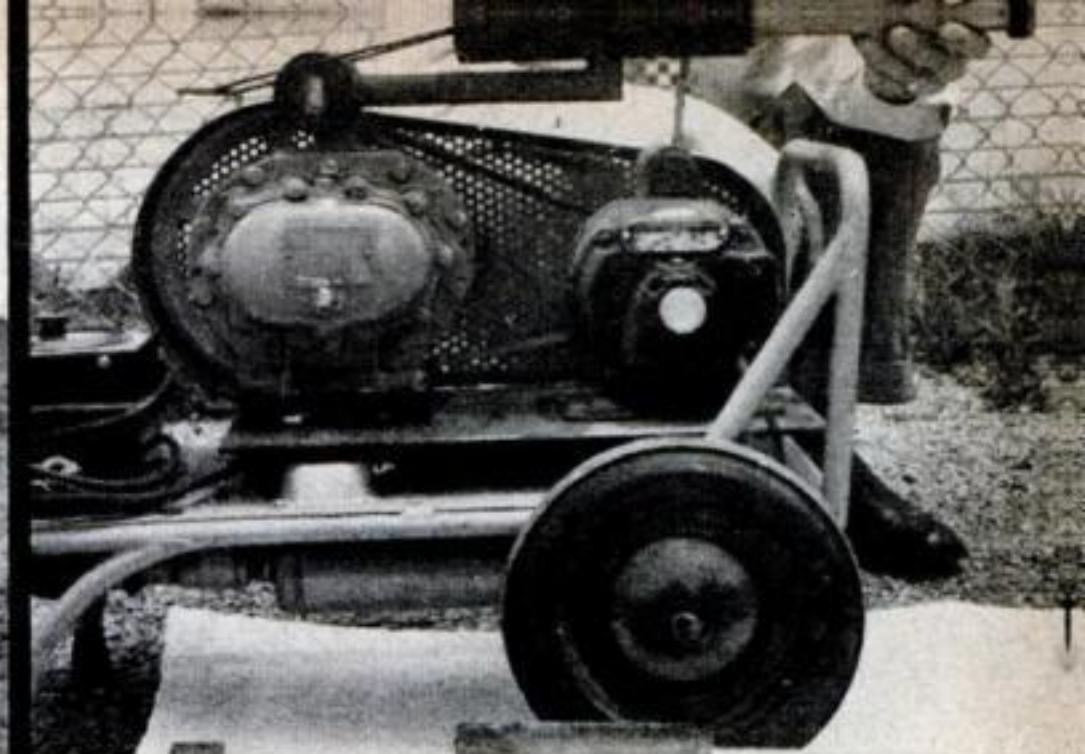




Geiger-counter man acts as "Seeing Eye dog" for radio operator. Person without detection equipment is blind for all practical purposes while in contaminated area. He can't see, taste, smell, or even feel deadly radiation until two weeks too late for him to do anything about it.

hard way. Students themselves planned the operation in outline, led by instructors Dr. Ralph T. Overman and Dr. Elda Anderson. Some of the men were battle veterans who gratefully remembered their Army basic training exercises—for example, the "infiltration course" in which troops crawled on their bellies over the ground beneath a hail of live bullets.

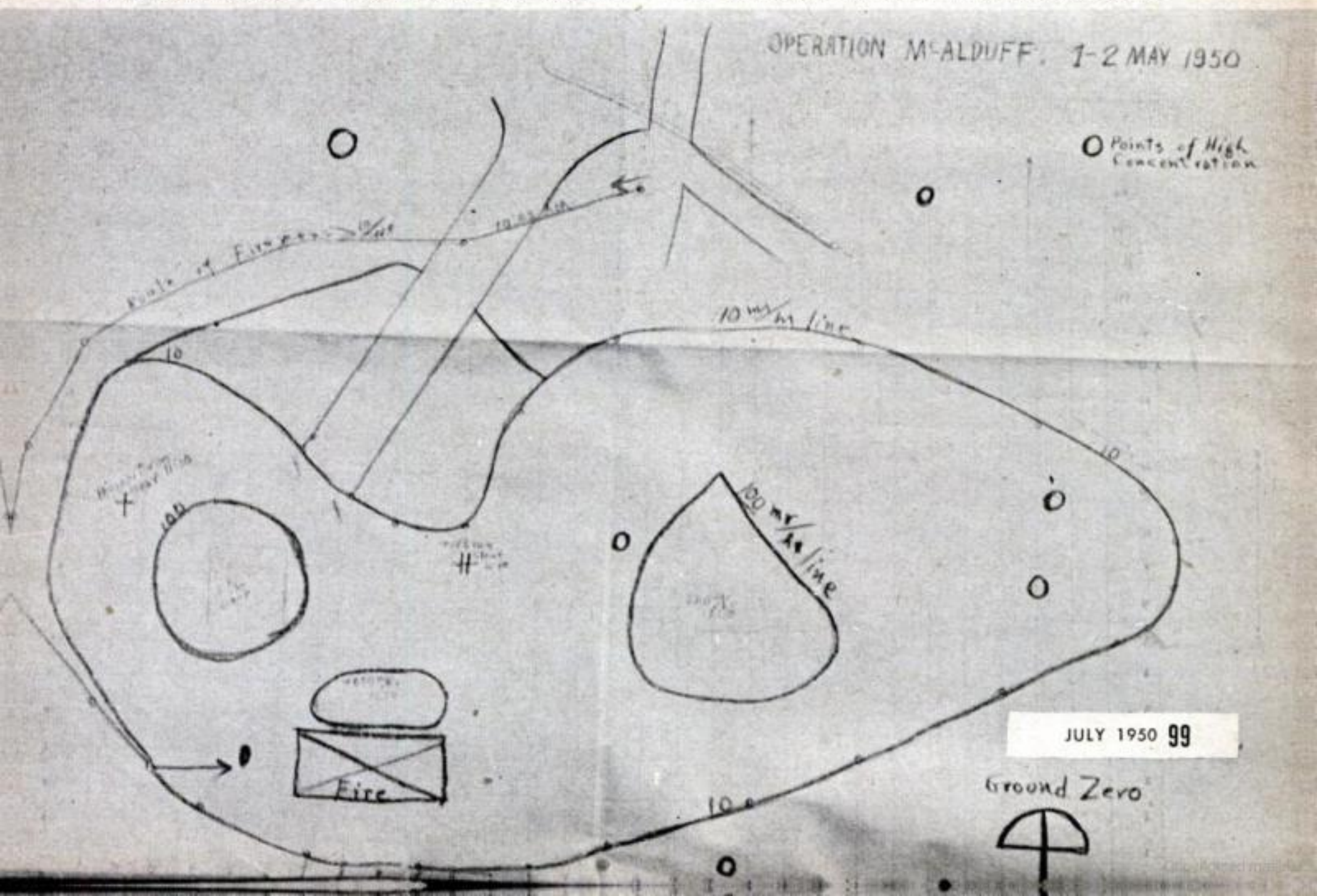
Map below shows how data is plotted. Outer line shows comparatively low reading of 10 mr per hour. You could stay here six hours without getting overdose. Hot spot shown on opposite



Filtron is used to check radioactivity of air. Portable generator sucks five cu. ft. of air per minute through tube containing porous cardboard cylinder, which filters out any radioactive dust from air. Tube is then checked with Geiger counter and extent of contamination computed.

At Oak Ridge they used live bullets of radiation—alpha, beta, and gamma particles. Dr. Anderson put a bandanna over her gray locks, climbed into a pair of blue denims, and spent a rainy week-end seeding the area with hot materials. Three "curies" of radio-cobalt were buried several feet in the earth. Radioactive potassium bromide was scattered over the earth's surface, and solu-

page is plotted on map just north of communications center. Single line with cross-marks gives filtron reading after fire. Air-sample readings indicate that all is clear at that point.





Firemen brought the blaze under control in an hour, even in the face of a brisk wind. Hose line shown here closely follows line charted on

map by remote plotters, from data radioed back by monitors. Sensitive counters found "dent" in radiation through which fire could be reached.

tions of it were applied with brushes to the walls of buildings and to scraps of debris.

Zero hour at 10 o'clock next morning was signaled by smoke bombs that wrapped the buildings. Four minutes later, flames appeared and the class went into action.

Under strictest instructions not to enter the "hot" area, I watched from across 200 yards of innocent-looking grass emitting perilous rays. Even before I could report to the scene I'd had to don white coveralls and slip on rubbers—I was to carry away no trace of mud from the scene. The famous mud of Oak Ridge was not only sticky that day—it was loaded.

Geiger men told me bluntly where to walk and how close I could get. I was willing to take orders. As a reporter I've taken my chances in burning buildings—but here, your eyes and ears gave no warning.

Three squads, into which the class was divided, took turns working in areas. They carried not only Geiger counters but half a dozen other instruments to detect and measure radiation.

First a "survey" meter nosed out the rough outlines of the hot spots. This could be done almost on the run. Then came instruments to measure the precise amount.

When a middle-aged veteran fireman of the Laboratory Fire Department was overcome by the heat, the trainees had an acid test of their coolness and skill. It took a half minute to realize this was not a pre-arranged part of the test. Then the squad on duty monitored his boots and gloves as he was carried from the field. They wanted to know not only whether radiation was there—but just how much, and no mistake.

The fire was brought under control within an hour. Only wisps of smoke appeared after that time, but for another hour and a half the counters buzzed and the trainees took hundreds of readings. Everything leaving the contaminated area had to be checked. Rubbers or boots sticky with menacing mud, mine among them, were left behind at Oak Ridge as the exhausted trainees and firemen left the area.

Next day the lessons of the exercise were



Besides Geiger counters, atomic air-raid wardens need plenty of ordinary wrapping paper. Paper protects equipment from alpha particles, which have such low penetrating power that they can't pierce human skin. Equipment must be kept off ground, especially when it's muddy.



During decontamination process, tires and chains of fire-fighting equipment get a thorough going-over from the electronic eyes and ears of trainees. If a fire hose is lying in dry grass, it needs little attention. If in a puddle of water, it must be monitored for radioactivity.



On decontamination day, radio operator reports 100 mr reading from powerhouse ruins. That means a repairman could stay there only 30 minutes a day. Anyone trapped for several days would be in bad shape. But only a very low-level bomb burst would produce this effect.



Neutron detection is tough, usually must be done indirectly. Here a sheet of photographic film sandwiched between sheets of aluminum foil is placed on ground. Plywood weight keeps it from blowing away. After exposure of an hour or so, neutron radiation shows on film.

driven home when observers were permitted to enter, with the squads, on their follow-up mission of decontamination.

Gas masks were not necessary. Air sampling had given an "all clear" reading the day before. But all the rest of the equipment was used again. Main task was to dig up the extremely hot cobalt and put it securely away in improvised safes of lead bricks. The crews also went over samples of glass, steel, plastic, and other materials with various cleaning agents. The agent used does not matter much, and water and elbow grease are as efficient as any. *Nothing* is sufficient on any porous material.

Besides coveralls and rubbers, this time they also suggested I wear white gloves. When I told them I couldn't work my camera with gloved fingers, they let me go bare-handed. But I was cautioned to touch nothing, not even a blade of grass.

Gingerly I followed Dr. Overman and our Seeing Eye Geigerman into the muddy area. "Watch out!" a Geigerman shouted at me. I had momentarily forgotten my in-

structions and started to put my camera on the ground, preparatory to changing film for a new group of shots. Nothing could be permitted to touch the ground unnecessarily. As for the camera, the nuclear radiation would fog my film as surely as if I unfurled a roll to the sun's visible radiation.

I took a few photographs of the mopping-up operation. I wasn't sorry to be told, then, that the 45 minutes of permitted time had elapsed and that I and my "watchdog" would have to leave.

As I took a last look at the charred timbers of the rehearsal fire—still glowing with unseen atomic disintegration—I fervently hoped we would never see an American city shattered by a real bomb, blasted and poisoned by these elemental forces.

Paul J. Larsen, director of NSRB's agency of Civil Mobilization, emphasizes that advance planning under way for civil defense does not mean that the government feels war is close or even probable. But it knows that Pearl Harbors are the result of unpreparedness.

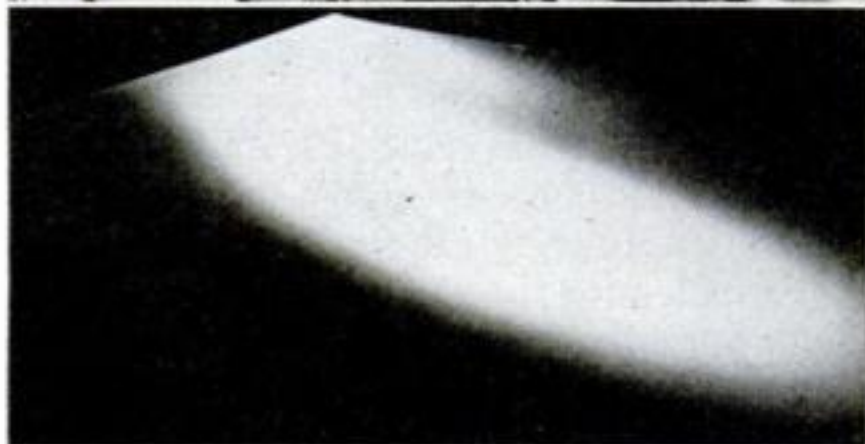
END



Jet Flying Wing Reports for Aerial Photo Duty

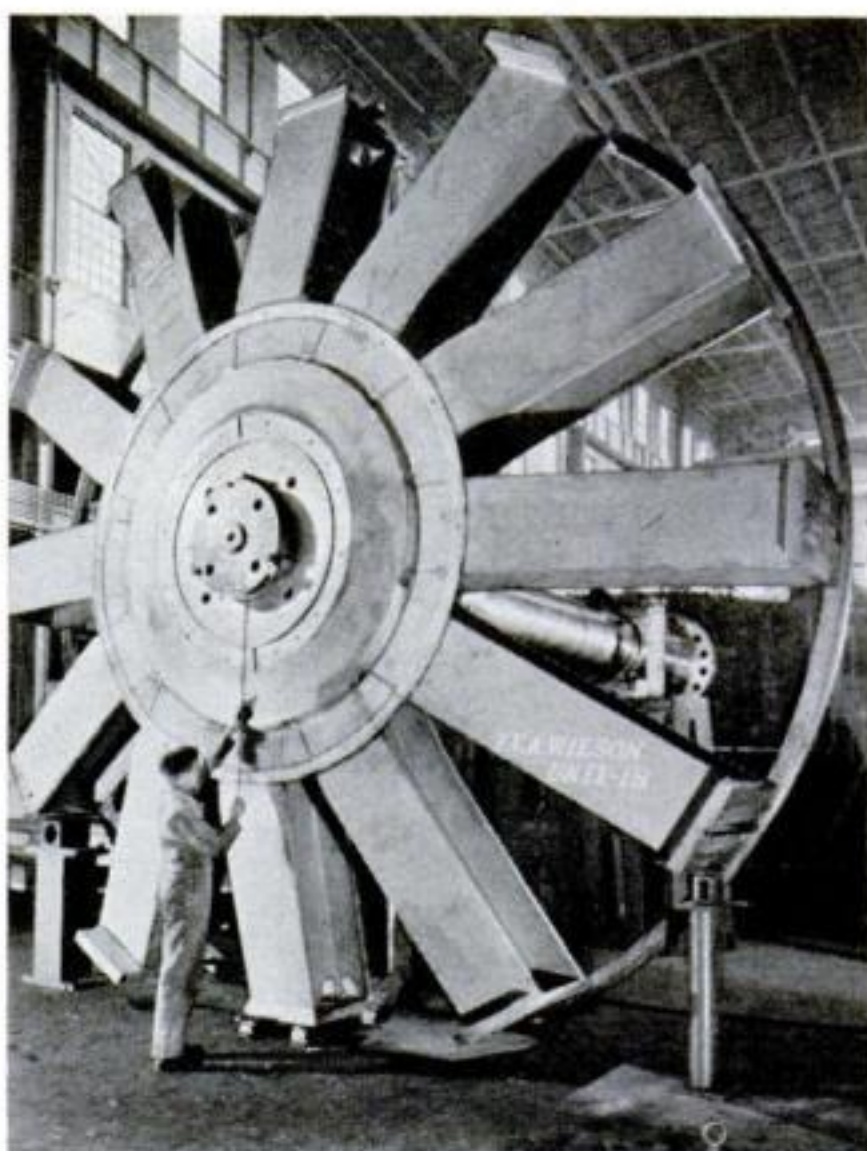
THIS latest version of the Northrop Flying Wing, the YRB-49A, is designed for long-range, high-altitude, photo-reconnaissance missions. It's powered by six J-35 turbojets, each delivering 5,000 lb. of thrust. Four engines are mounted in the wing, two more

in pods slung beneath it. Performance has not been announced, but a predecessor, the YB-49, set a jet endurance record in 1948—3,701 miles nonstop in nine and a half hours. The same plane was said to be in the 500-m.p.h. class at 35,000 feet.



New Beam May Cure Disease

APPLYING high-speed electrons directly to cure disease, a promising innovation in therapy, will be tested with the GE synchrotron in top photo above. Its electron beam, which made the imprint above on a photo film between wooden blocks, can attain 70,000,000 volts and is believed the most powerful ever led into open air. Turned directly on a surgically exposed tumor, instead of aimed at a target to produce X rays, the beam provides radiation as intense as X rays but without harmful penetration.



More Power for TVA

WHEN completed, this giant rotor spider will help furnish more hydroelectric power to the territory served by plants of the Tennessee Valley Authority. The spider will be installed in a new 13,800-volt vertical generator at TVA's Wilson Dam. The generator will be coupled directly to a 35,000-hp. hydraulic turbine, one of 18 that eventually will be in operation at the dam. Immense size of the partially completed rotor is indicated by comparison with height of workman adjusting the intricate machinery.



At haying time the Dodge Power-Wagon saves backbreaking labor. Here a homemade wooden

ram, mounted on the front bumper, easily pushes several hundred pounds of hay up a rack.



A post hole is dug in 20 seconds, as the hydraulic lift forces the digger downward, while power from the engine turns the bit. Rear take-off also powers other belt-driven equipment.

Hydraulic Lift Added to Truck

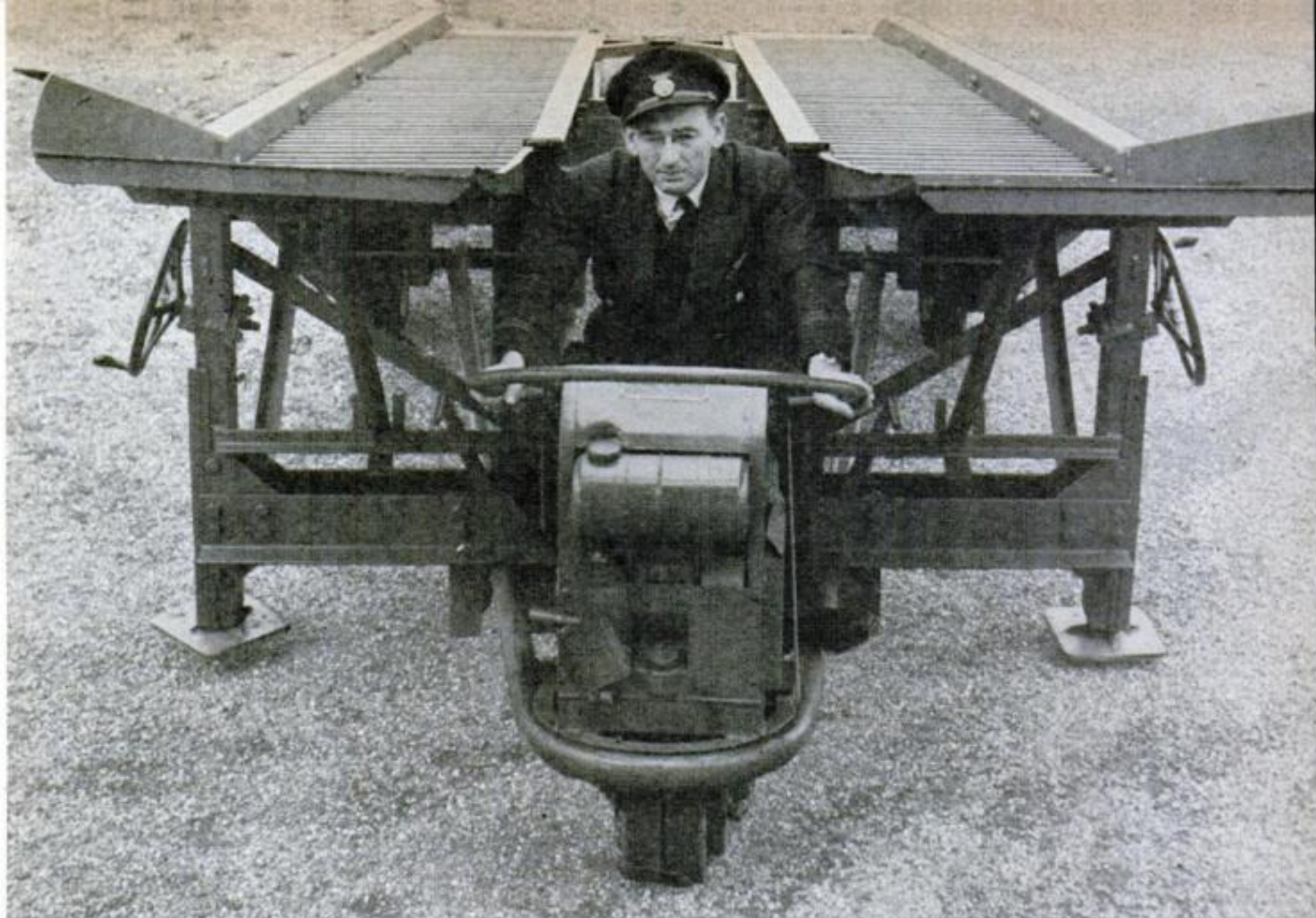
A HYDRAULIC lift and a power take-off make the 94-hp., four-wheel-drive Power-Wagon, recently announced by Dodge, a jack-of-all-trades around a farm. A belt drive from the engine operates a front-mounted hydraulic pump. This transmits fluid pressure to a cylinder at the rear that powers a lift designed to pull, lift, and operate any three-hitch implement. It also will apply down pressure up to 500 pounds to force an implement into the ground. The power take-off can run any sort of belt-drive equipment, according to Dodge. The truck body has a 58-cubic-foot capacity.



Some 500 pounds downward pressure can be exerted on plows, harrows, or earth-diggers. Finger-tip controls in cab allow raising implements hydraulically to clear rocks and stumps.



A 7,500-pound capacity power winch, driven from the front power take-off, has 250 feet of 7/16 inch cable for many farm, construction, and lumbering jobs, such as pulling logs, above.



World's first automobile air ferry uses this motorized ramp to speed loading and unloading.

World's First



Air Ferry for Cars

Air freighters and a novel loading ramp combine to speed motoring tourists across the English Channel.

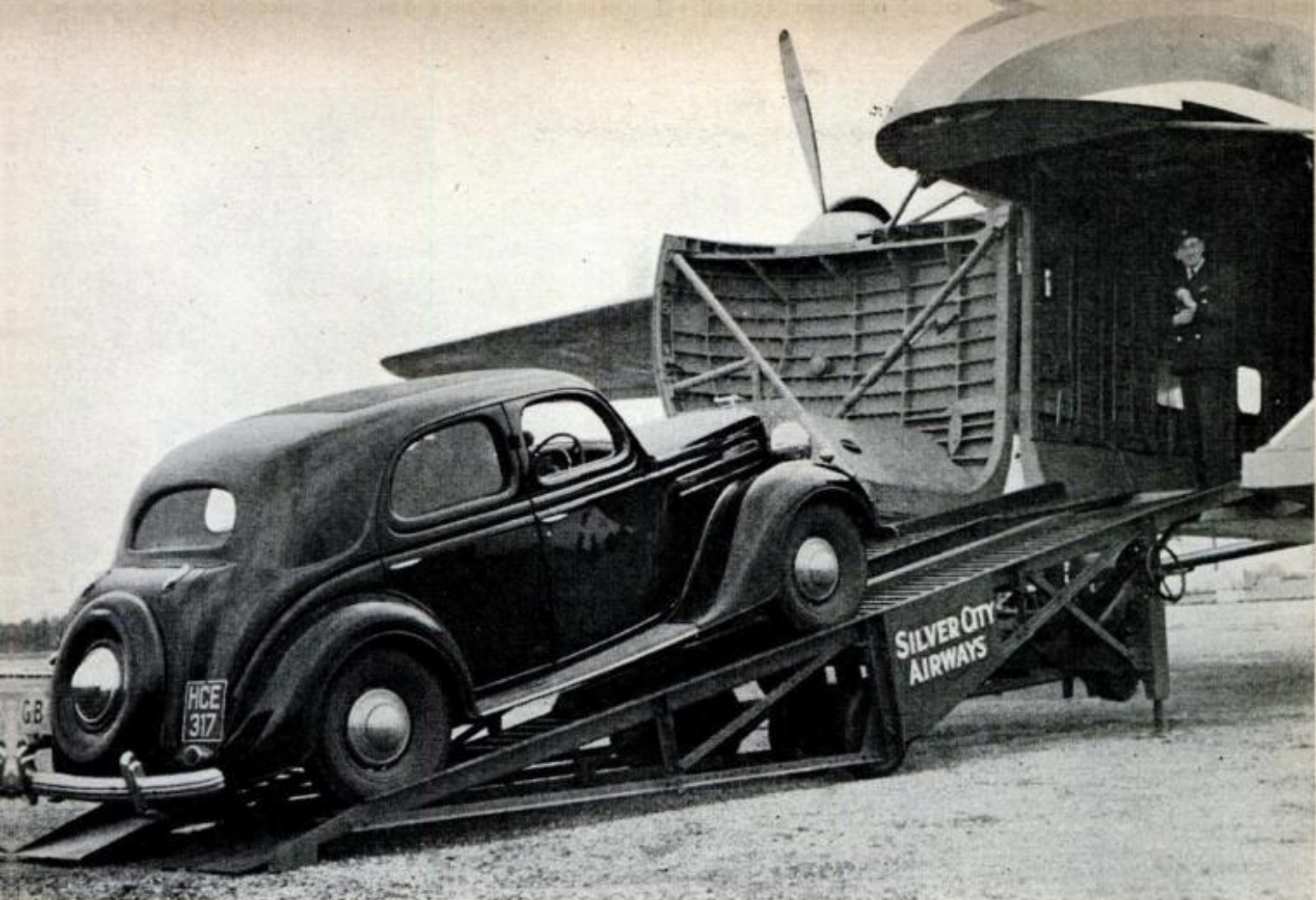
By Devon Francis

RIGHT after the war was over, a chap who had served as an officer in Britain's Royal Air Force fell to wondering what he could do with airplanes that nobody else was doing. After a lot of deep thinking he came up with the answer: Why not air-ferry automobiles where automobiles couldn't be driven? Specifically, an over-water air

hop to the European continent? That wouldn't be hard, with the Continent only the width of the English Channel away.

Today Silver City Airways, of London, headed by Air Commodore Griffith Powell, is shuttling thousands of cars across the channel each tourist season. The flight of 42 miles, from Lympne airdrome in England to Le Touquet, France, takes 20 minutes. The price for a good-size car is about \$89, and four passengers ride for free.

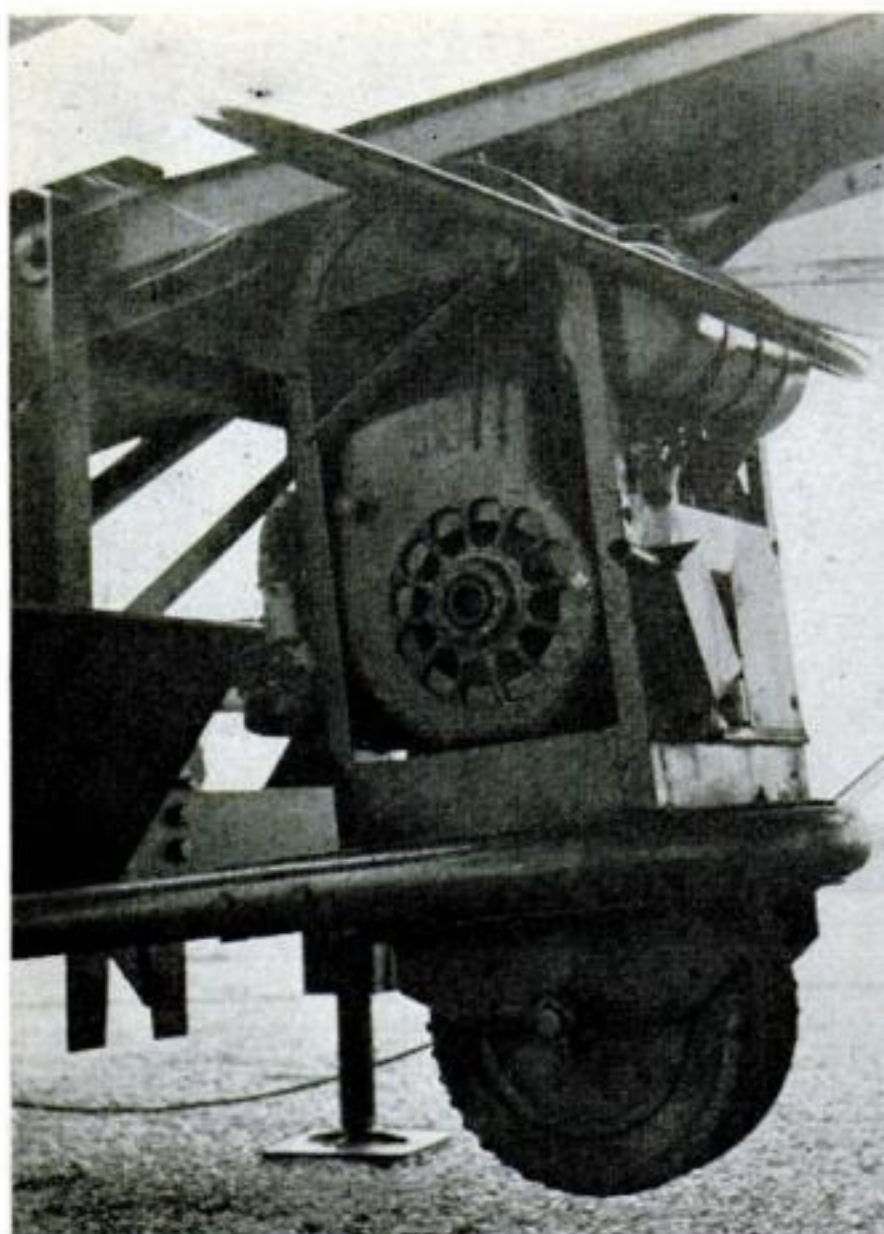
The real trick in the deal is a motorized ramp that can be put in place in two minutes flat. Loading takes about a minute.



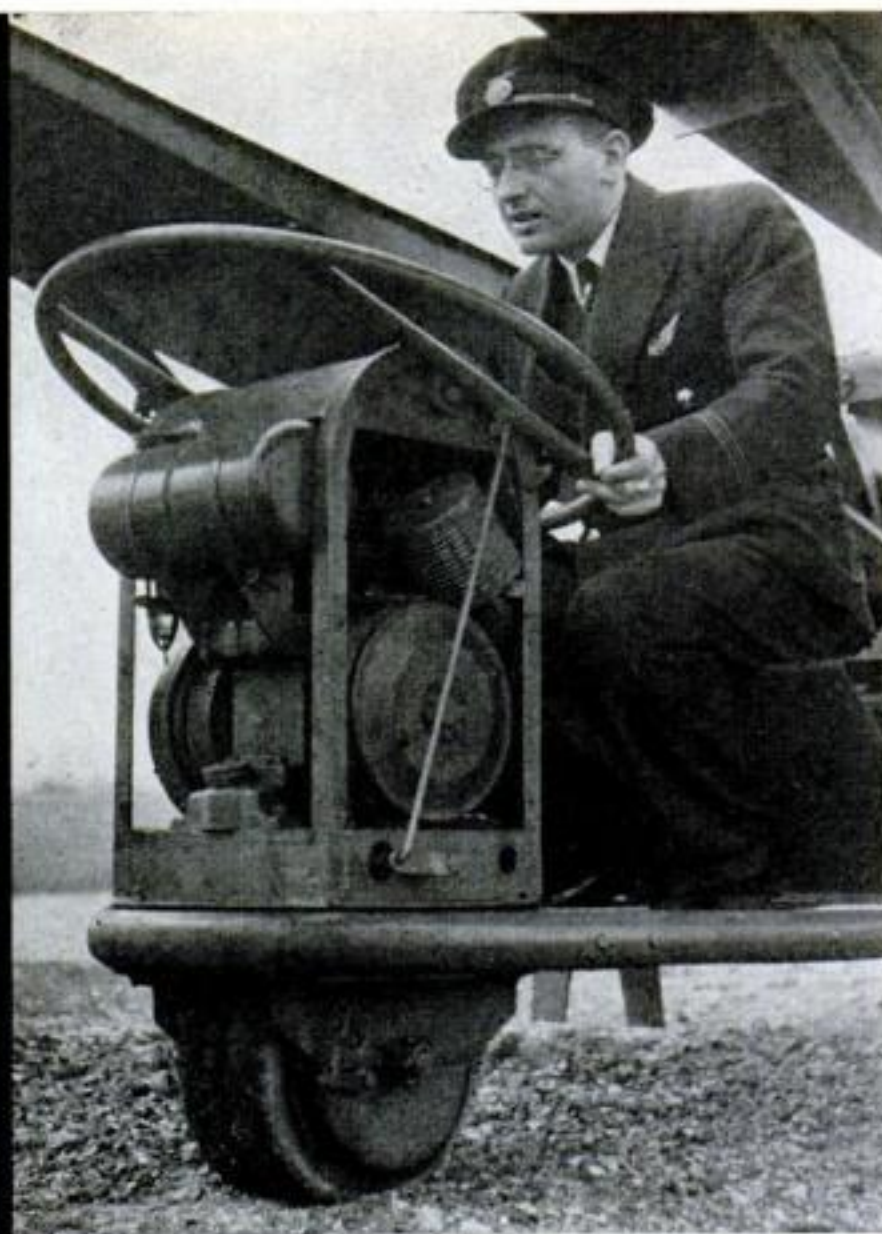
Cars are driven into maw of Bristol Freighter under own power. Airplane can take two cars.



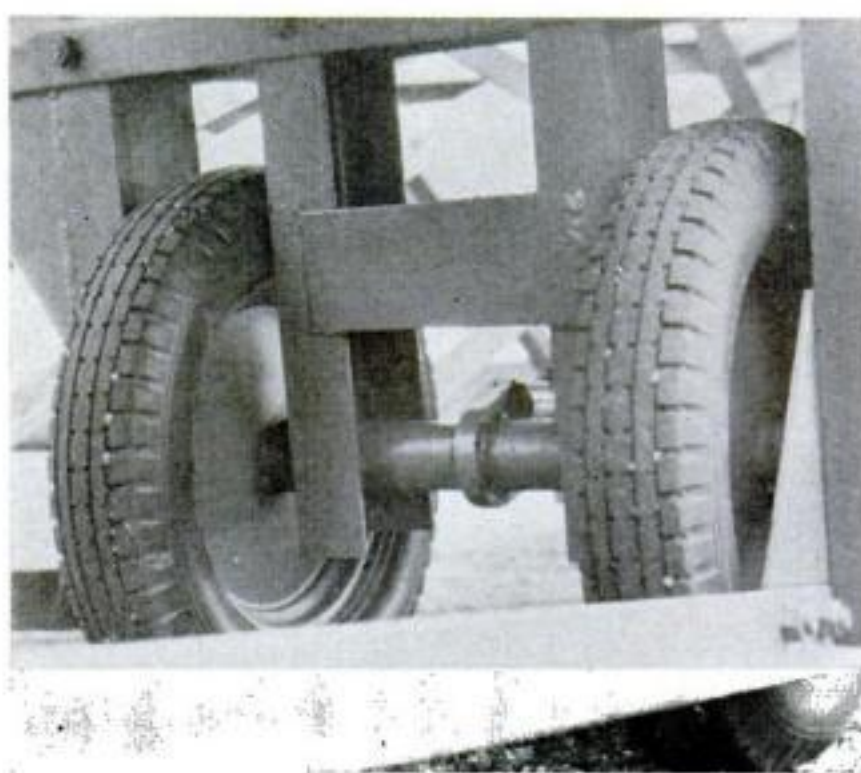
Ramp rolls on wheels, is stabilized for loading and unloading with jacks. In photo above attendant is removing an extension link of the ramp's track. [Continued on next page.]



This is a close-up of ramp jacked up against plane. Front wheel is lifted clear of ground. Ramp's length is 20 feet and extension links 6 feet. Chief advantage of air-ferrying cars across channel is saving of hours of time in boat travel. Planes used are twin-engined.



Ramp's motive power is 2½-hp. 2-cycle engine. Driver has only one control. By pivoting steering wheel downwards he opens throttle and engages clutch. Raising wheel closes throttle, disengages clutch, applies brake. He reverses direction by turning wheel around.



Two pairs of double 18-inch wheels (above) support rear of ramp for wheeling around airport. Wheels have plain axles and are not sprung. Ramp's maximum speed is 5 m.p.h. Company expects to ferry 5,000 cars this summer season.

Jacks (left) are raised and lowered by hand. At workman's right is one of ramp's two extension sections. A dozen versions of ramp were built before design was adopted. Silver City Airways has been ferrying cars for three years.



Mobile Light Protects Kids

FOR street crossings near schools and at places lacking permanent lights, this mobile battery-operated traffic light is easily rolled where and when needed. Mounted on a

small, two-wheel truck, the light pole can be dismantled and stored in the battery case when not in use. A "school" sign or conventional red and green signals can be adjusted to operate steadily or to flash at intervals. Streeter-Amet, Chicago, makes it.

Toy Shovel Hooks on Tricycle

A DIGGING toy to delight any child is this Trike Shovel, which hooks onto the handlebars of a tricycle. Worked by two rubber-covered levers, the shovel actually digs, scoops up sand or dirt, and dumps it wherever wanted. Left-hand lever swivels the shovel to either side; right-hand lever scoops bucket through sand and raises it to a position where a chain automatically opens and dumps the bucket. Made of aluminum, the toy is sold by Miles Kimball Co., Oshkosh, Wis., for \$2.95.



'Dozer Fangs Rip Up Rock

THE four curved shanks attached to the moldboard of bulldozer at right are capped with steel-alloy teeth. Back up the 'dozer, and they rip up rocks and hard ground. The attachment doesn't interfere with normal blade operation, and can be locked out of the way when not used. Back Rip Scarifiers are made by Preco Inc., Los Angeles.





Harnessed Sunlight Grows Food by Tankful

Future "food factory" is visualized by artist. Chlorella and nutrient fluid circulate endlessly in 59 sunlit U-shaped tanks, glass-covered and

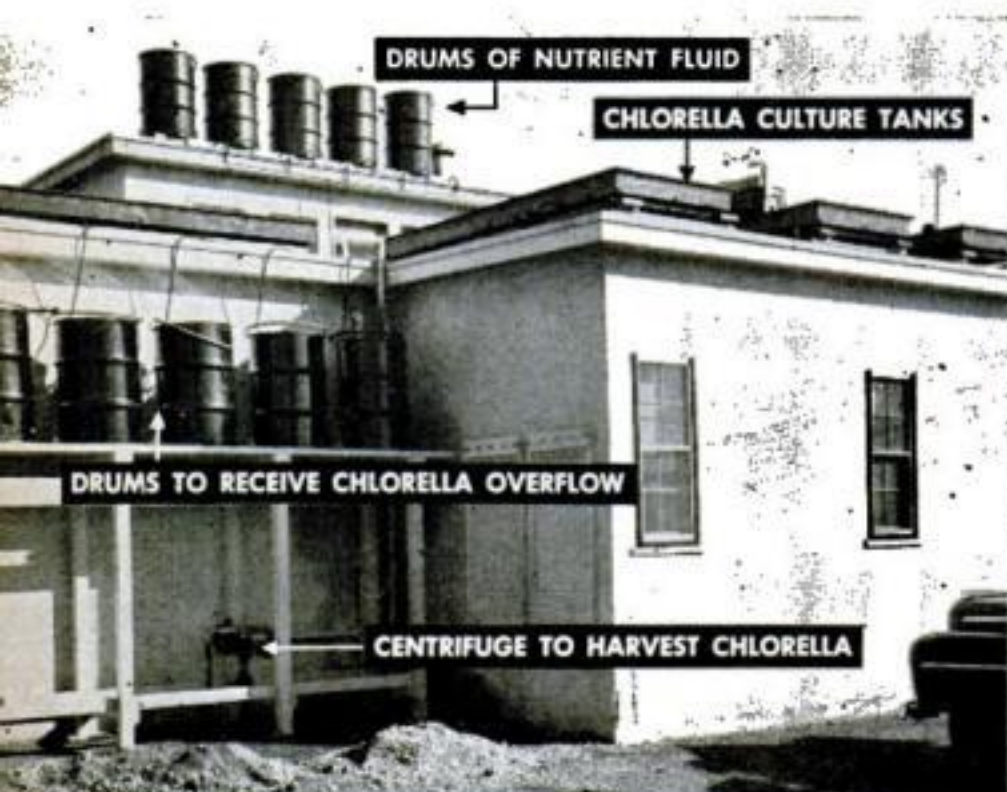
shallow, each 2,100 feet long and four feet wide. Crop is "harvested" from a part of the flow continuously diverted to processing plant.

A TINY green, edible fresh-water plant called Chlorella may end world food shortages. Far more efficiently than any present farm crop, it harnesses the sun's energy to make food from carbon dioxide, water, and minerals. Grown in tanks in mass-production "food factories" of the future, it could multiply an acre's yield tenfold. A "pre-pilot" plant, already in operation at Stanford Research Institute in

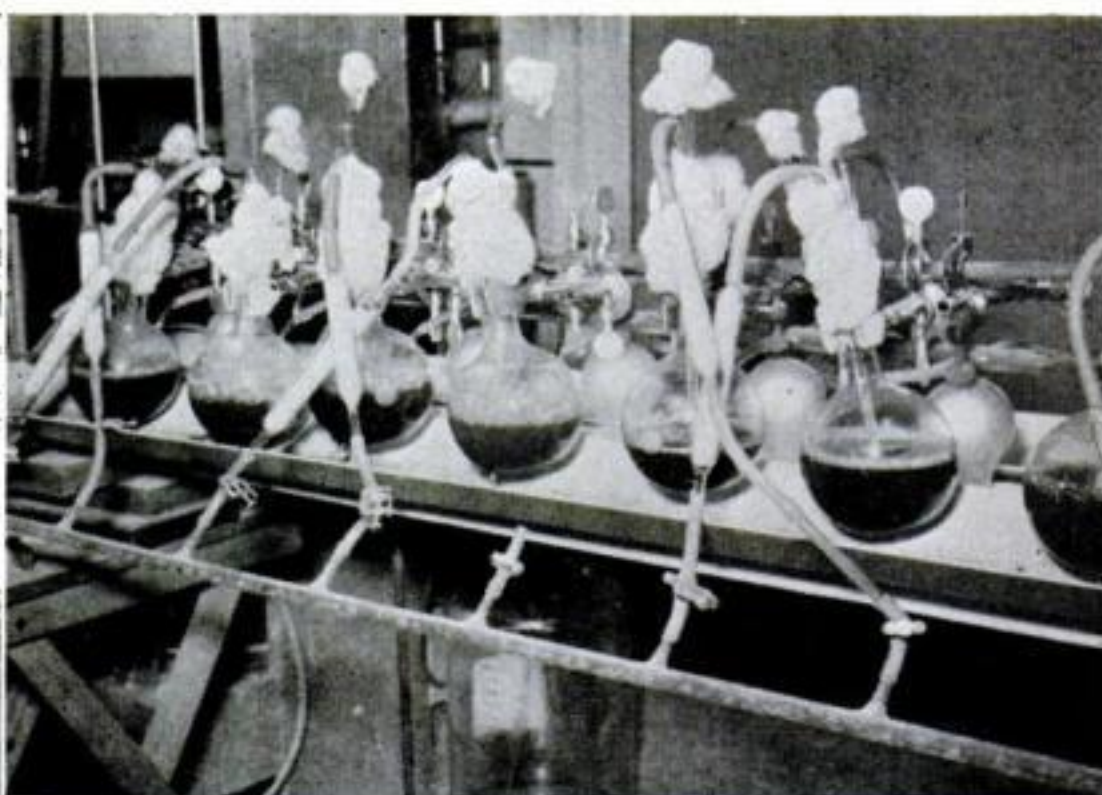
California, shows how the method works.

Individual Chlorella plants, belonging to the one-celled group known as algae, are microscopic globules. They thrive in a mixture of water and minerals "aerated" with carbon dioxide gas. Enormously prolific, they multiply every few hours by dividing in two. Devoid of stalks or other waste, the resulting mass is totally edible.

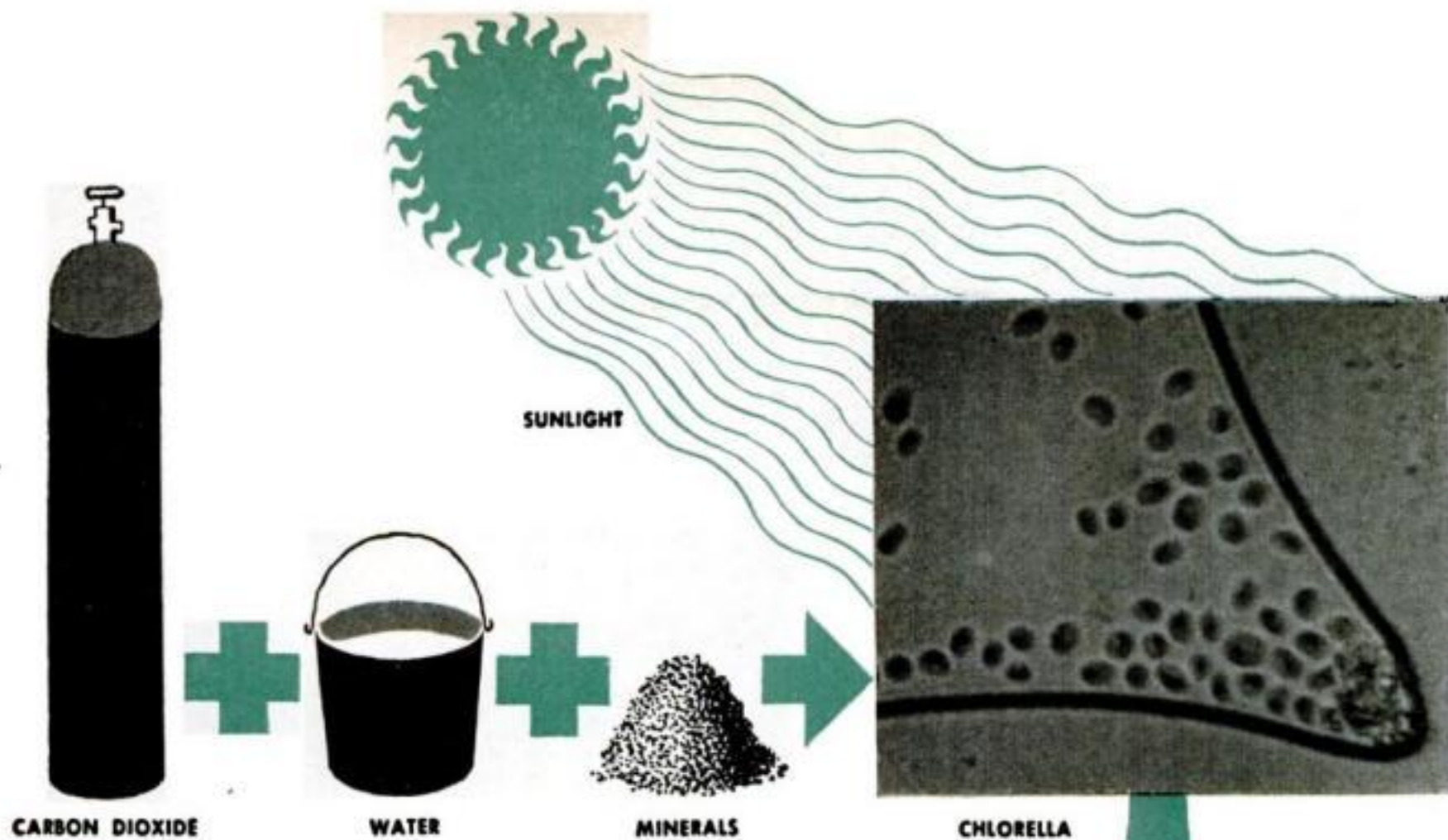
Rivalling the miraculous "shmoo," Chlo-



Stanford pre-pilot plant shows experimenters how to grow Chlorella for food. Centrifuge separates harvest from fluid on small scale. Big plant would do it by flotation process.



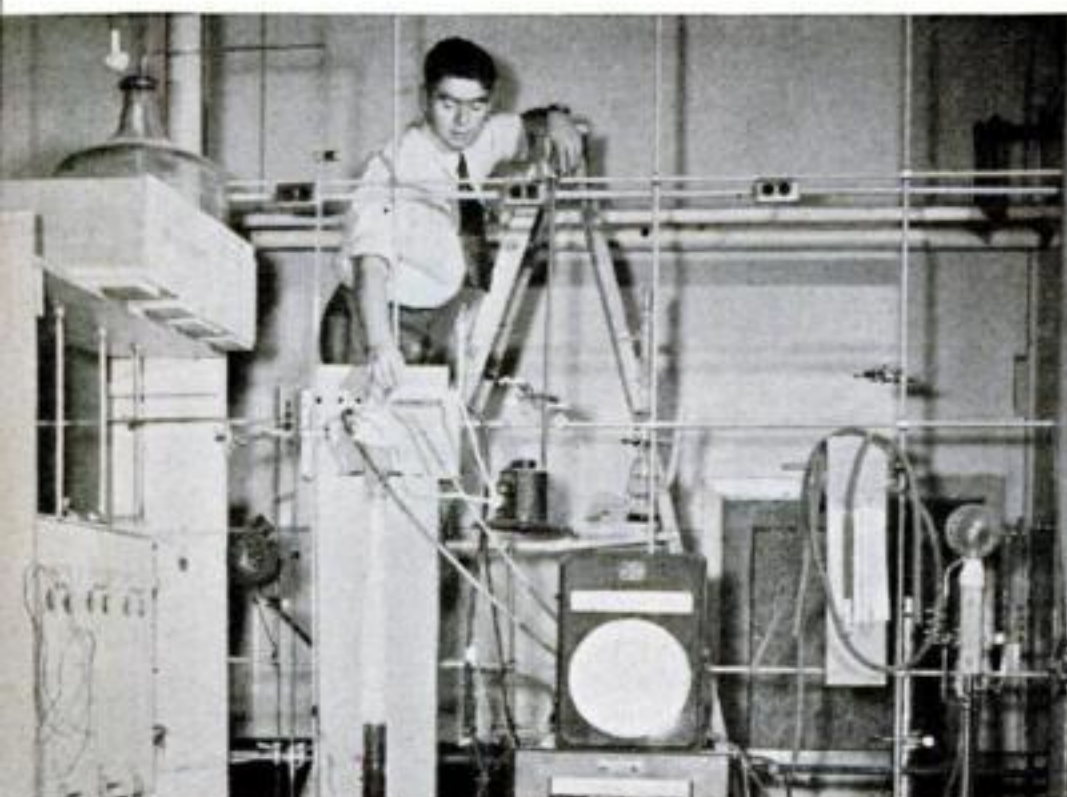
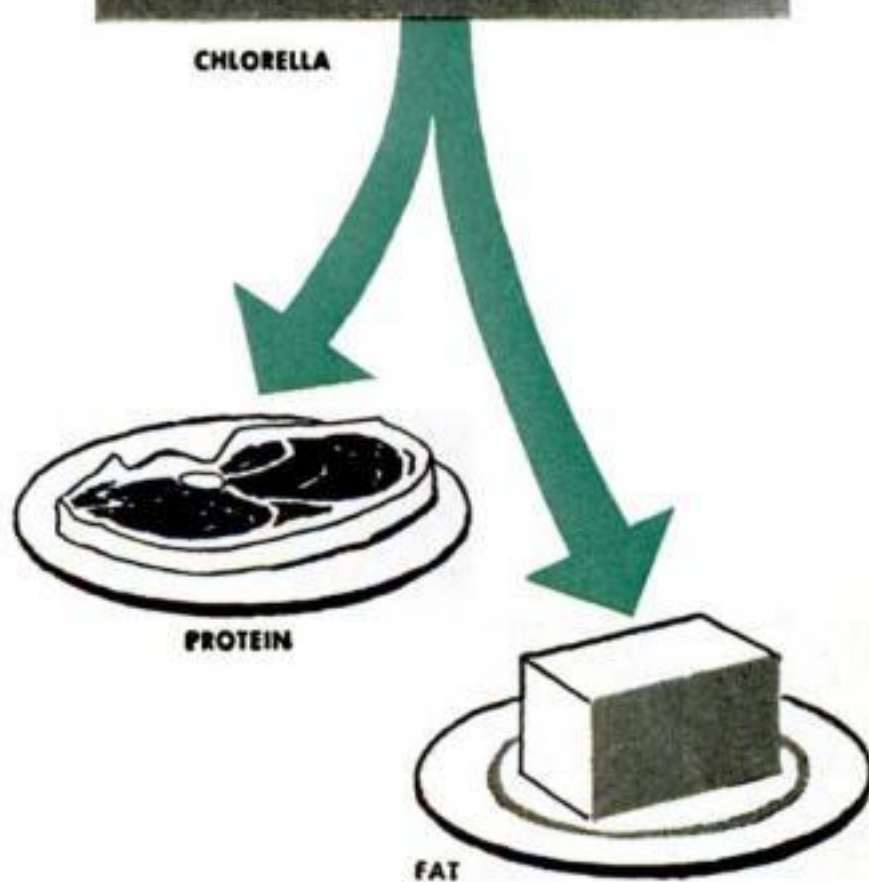
Early experiment was raising Chlorella in flasks lit by incandescent lamps. Tubes supply carbon dioxide. This "batch" culture method now is supplanted by continuous method.



Chlorella turns raw materials into protein or fat as wanted. Plants are tiny globules, magnified 500 times in microscope view (inset). V-shaped line is edge of liquid containing them.

Chlorella obligingly turns itself into whatever is wanted, experimenters find. On a nitrogen-scanty diet, it yields a light-yellow, bland-tasting product rich in fat, which would make a good oleo. More nitrogen gives a deep-green product high in protein content. Tasting like alfalfa when dried, it is to be tried out for feeding chickens and cattle, which would convert it into meat and milk for the table.

END



Fluorescent-lit vertical tube, in which Chlorella multiply endlessly for continuous-style culture, is adjusted by technician. Nutrient fluid enters at bottom, and overflow contains "crop."



Rooftop tanks 10 feet long and four feet wide grow Chlorella continuously on biggest scale to date. Photo cell, gauging growth in each tank, regulates liquid supply and overflow.



The frontier was never like this. This latter-day log cabin has two bedrooms, living room,

kitchen, and bath. It costs \$2,585, complete with garage, breezeway; can be put up in day.



Pre-Cut House Built Like Log Cabin

By Sheldon M. Gallagher

PS photos by W. W. Morris

THE early settlers who hacked their history and homes out of the North Woods wilderness would have to look twice to recognize this streamlined version of the rough-hewn log cabins that kept out winter storms and Indian arrows. For modern-day

pioneers have now borrowed this centuries-old construction for use in pre-cut, packaged houses you can buy in a department store and put up yourself over the weekend.

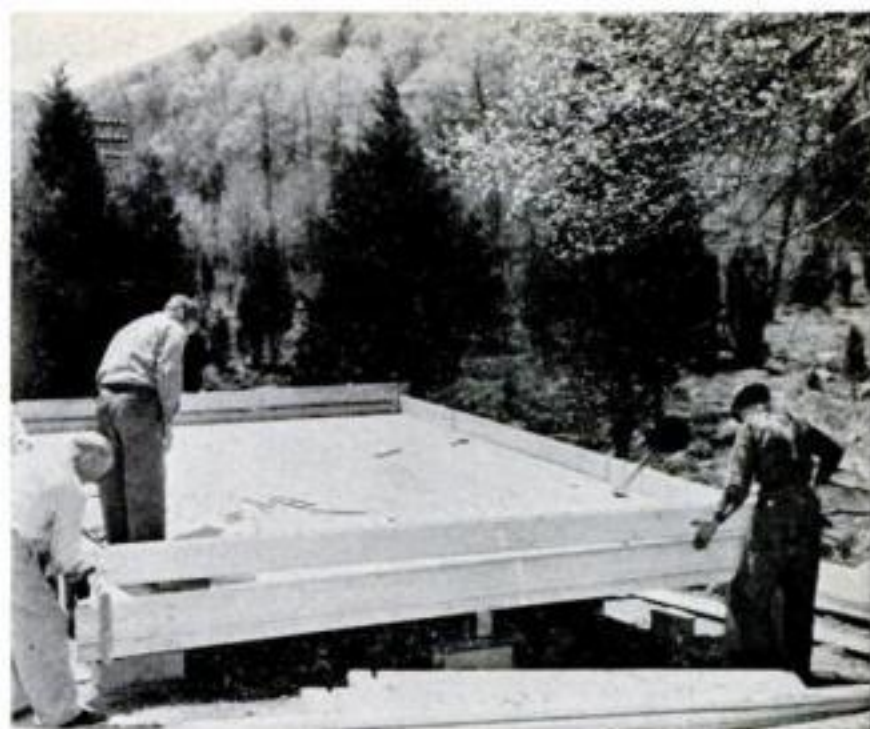
Introduced in this country by the Norge Company, of Norway, and sold by Macy's



Log-cabin construction is shown above. Heavy, 2-by-8-inch wall planks, notched at ends, overlap at corners and lock together. Numbers stamped on plank ends aid correct order of assembly.

in New York City, the "log-cabin" houses consist of heavy, two-inch-thick planks that are laid horizontally on top of each other to form both walls and interior partitions. Notched at each end like the logs of old, the planks interlock at the corners of the house to form tight, nailless joints that actually become stronger the longer the house stands. But unlike the logs, the upper edge of each plank has a wide, deep tongue that fits firmly into a matching groove in the bottom of the plank above, providing a strong, weathertight seam.

Each piece in the packaged house is pre-cut to exact length, eliminating all sawing and fitting, and is numbered to show just where it goes. All you have to do is place one piece on top of another and follow the numbers for the correct order. Where doors and windows go, the wall planks are cut to leave the proper openings. You simply take the doors and windows, which come pre-



Construction begins with floor, laid over joists in conventional way. Wall planks, tongue-and-grooved for tight, weatherproof fit, are then built up, one on top of another, horizontally.



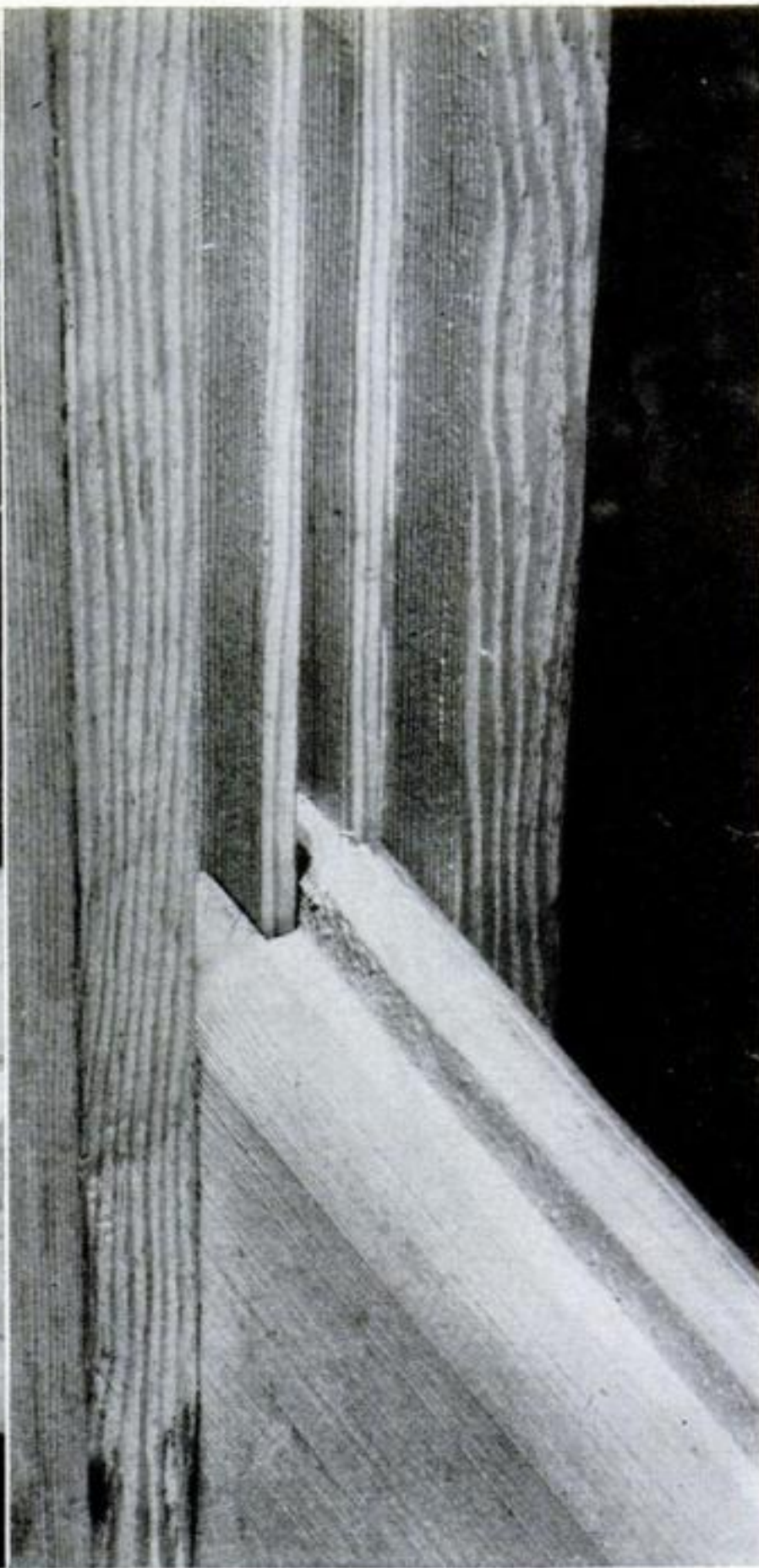
Floor boards fit into groove in bottom wall plank that supports ends, conceals edges. Floor, also tongue-and-grooved, is pre-cut to equal, instead of random, lengths to eliminate sawing.



Partitions, built up of horizontal planks, are formed in same way as walls. Ends of planks are tongued, slide easily into matching dovetail grooves in walls that lock them in place.



Pre-hung door, mounted in heavy frame, comes as single unit, is slid into place between wall ends as soon as wall reaches height of two planks. Interior doors go in at the same time.



Close-up of door frame, made of solid 4- by 4-inch stock, shows how double tongue-and-groove joint makes strong, weathertight fit with wall. Windows are fitted into walls in the same way.

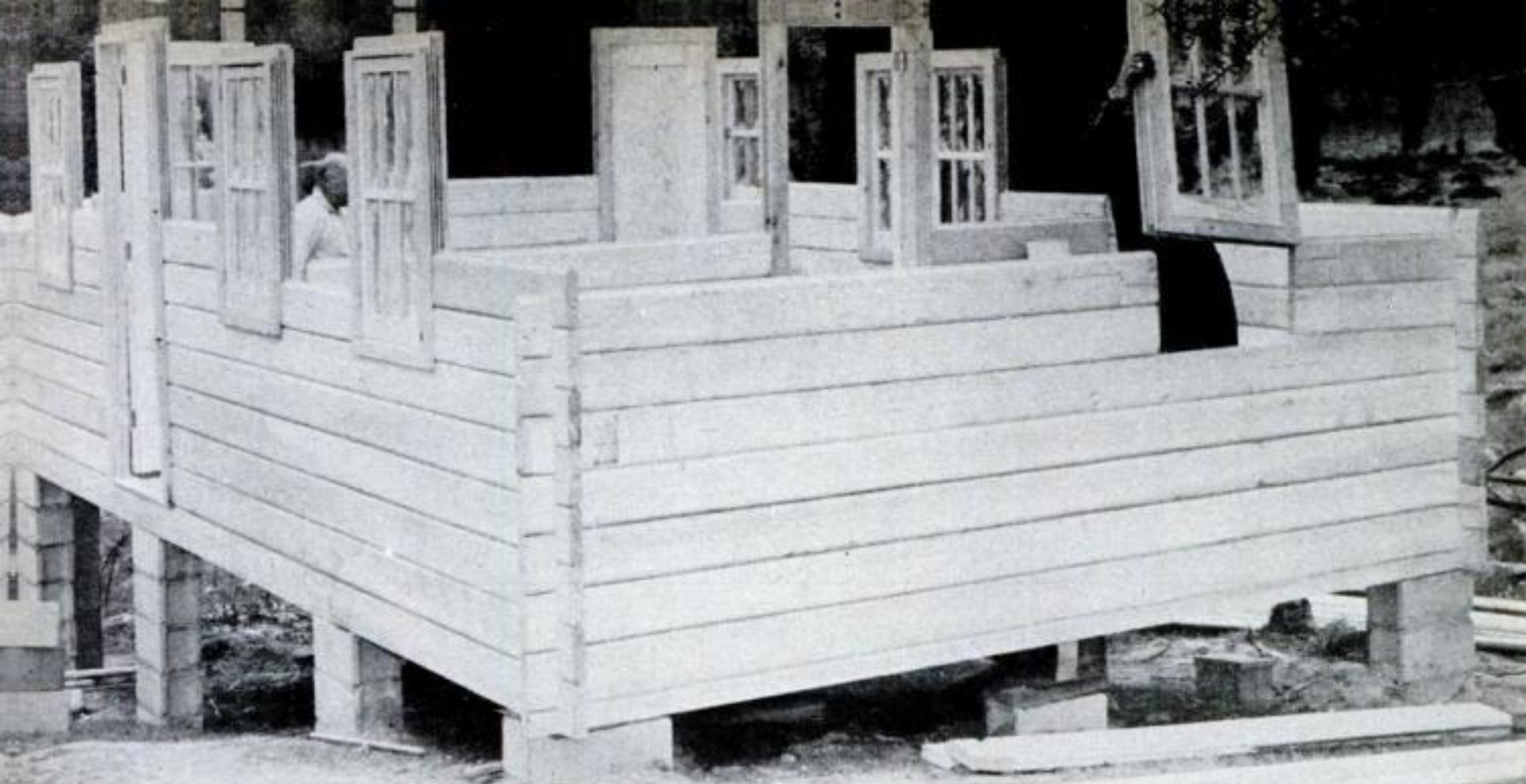
mounted in heavy frames, and slip them in place as the house progresses.

Except in the floor and roof boards, there isn't a nail or bolt in the entire house. The Norwegian-developed construction is called the Tregaard Interlocking System. Said to have withstood wartime bombings in Norway that wrecked ordinary frame houses, it owes its tremendous strength to its own weight and interlocked joints. And because each plank is held tightly to the one below it by the weight of the planks above, any shrinkage in the wood is automatically taken up by the downward pres-

sure of the upper planks—instead of opening up cracks, the house just settles a bit.

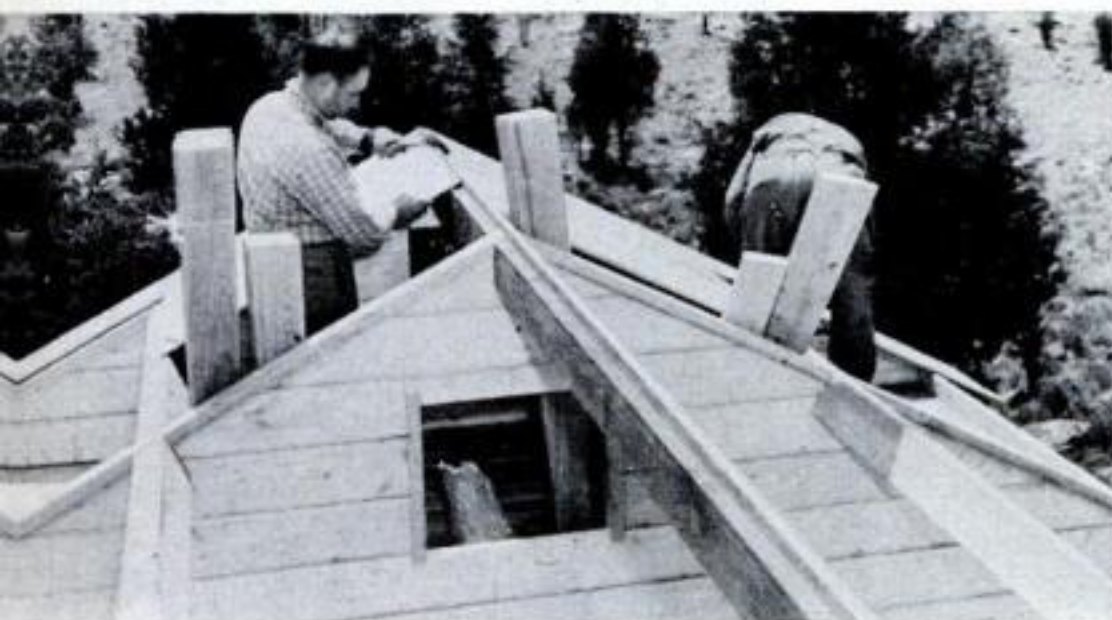
Although primarily intended for use in warm climates or as summer cabins, the Norge houses can be winterized for year-round use by installing heating units and insulation. The eight models now available range from a small, one-room cottage for \$595 to two- and three-bedroom houses that come, complete with garage and breezeway, for from \$2,585 to \$2,850.

Unwrap your packaged home on Saturday and, with good weather and friends to help, you should have it up by Sunday.



House begins to take shape as walls reach half-way mark and last window goes in. House shown, intended for summer use, is built on con-

crete-block columns. For winter use, it would need full foundation, or could be placed directly on ground over radiantly heated concrete slab.



Roof boards are nailed across heavy, horizontal beams that take place of conventional rafters. Boards are butted against narrow ridge on top of upper roof beam to insure even alignment.



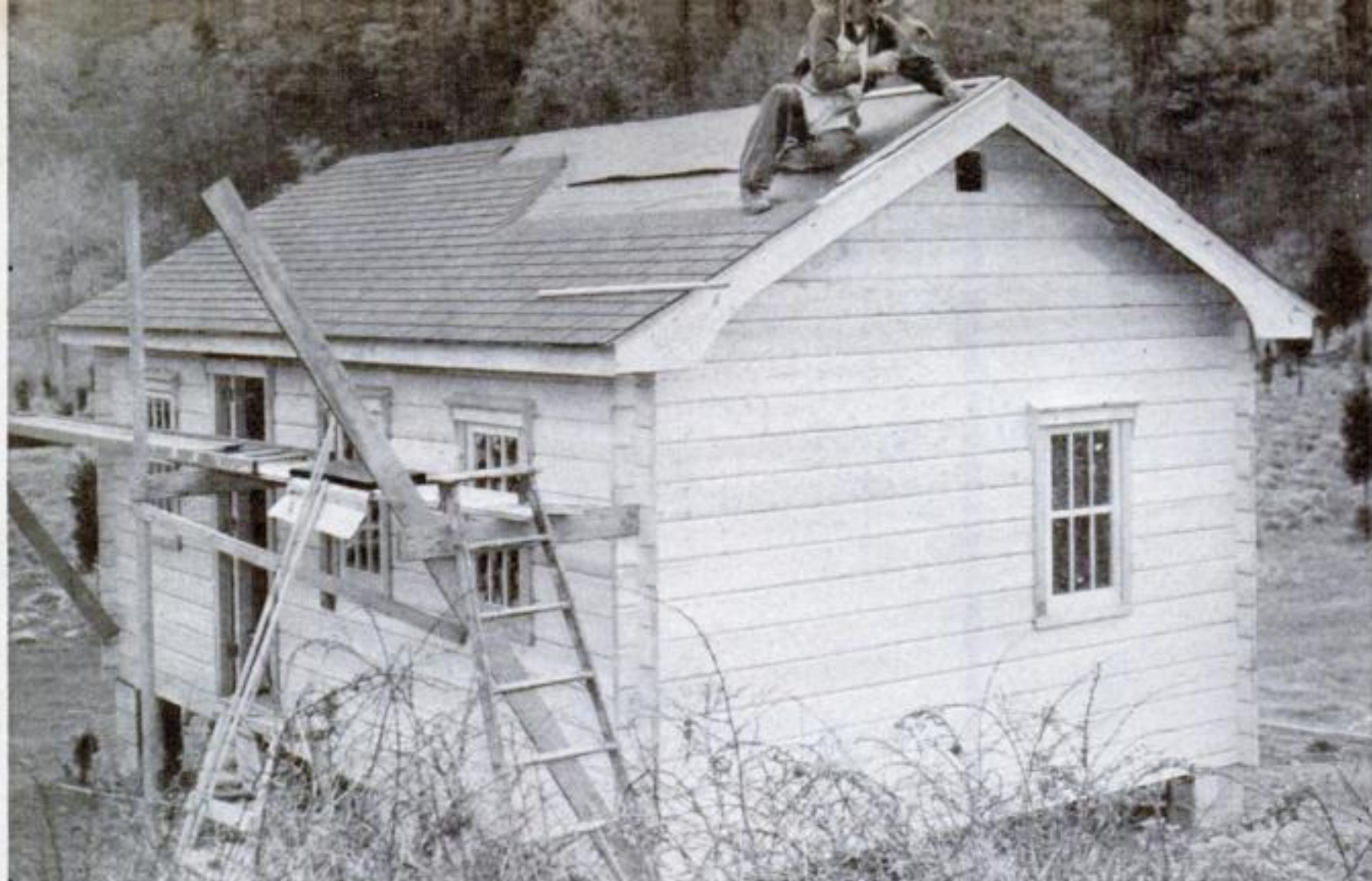
Nearing completion, house looks much like ordinary one except for protruding wall ends. A one-bedroom model, it measures 14 by 23 feet, costs \$1,220, was put up by two men in two days.



Unique roof construction is shown in interior view above. Roof boards are supported by three 4- by 6-inch beams that run full length of house and are in turn supported by house's end walls.



Decorative trim, pre-cut to exact size and shape, hides roof edges, is nailed to protruding ends of roof beams. Opening near peak is for ventilation louvers. [Continued on next page.]

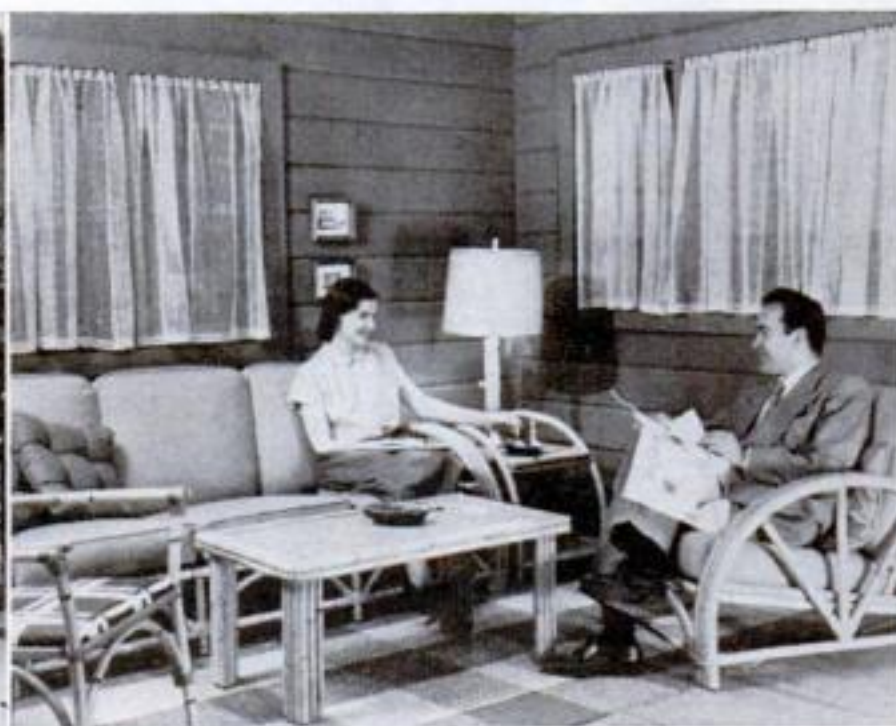


In final step, roof is finished off with conventional asphalt shingles, also supplied with kit.

Note shedlike trim nailed over windows to add decorative touch and help keep rain off.

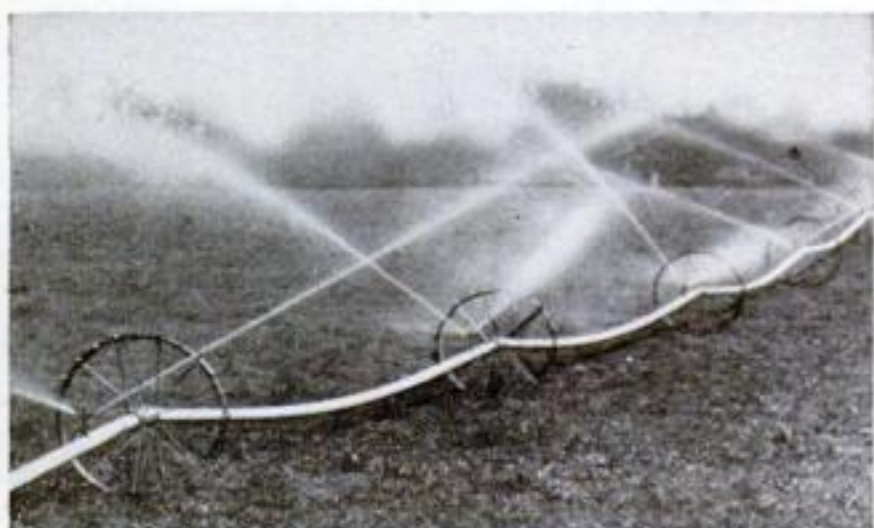


Log-cabin garage goes together like house, has modern, one-piece tilt-up door. This one-car model, 11 by 21 feet, costs \$585; a two-car version, 20 by 21 feet, can be had for \$900.

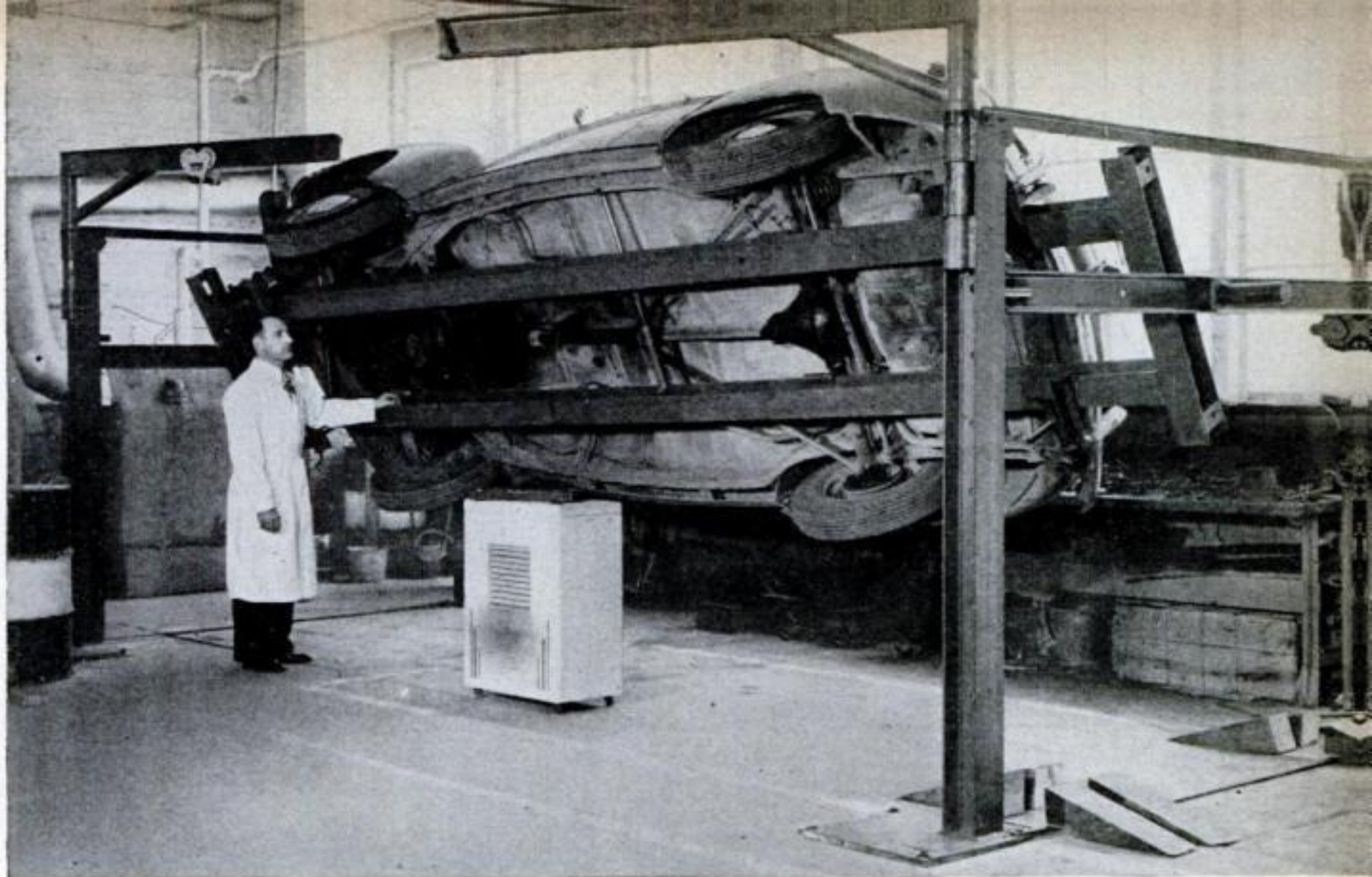


Within house, exposed wall planks give warm, rustic appearance, can be painted, as here, stained, or left natural. For winter use, they can be insulated and covered with wallboard facing.

Irrigation Pipes on Wheels Roll Across Field



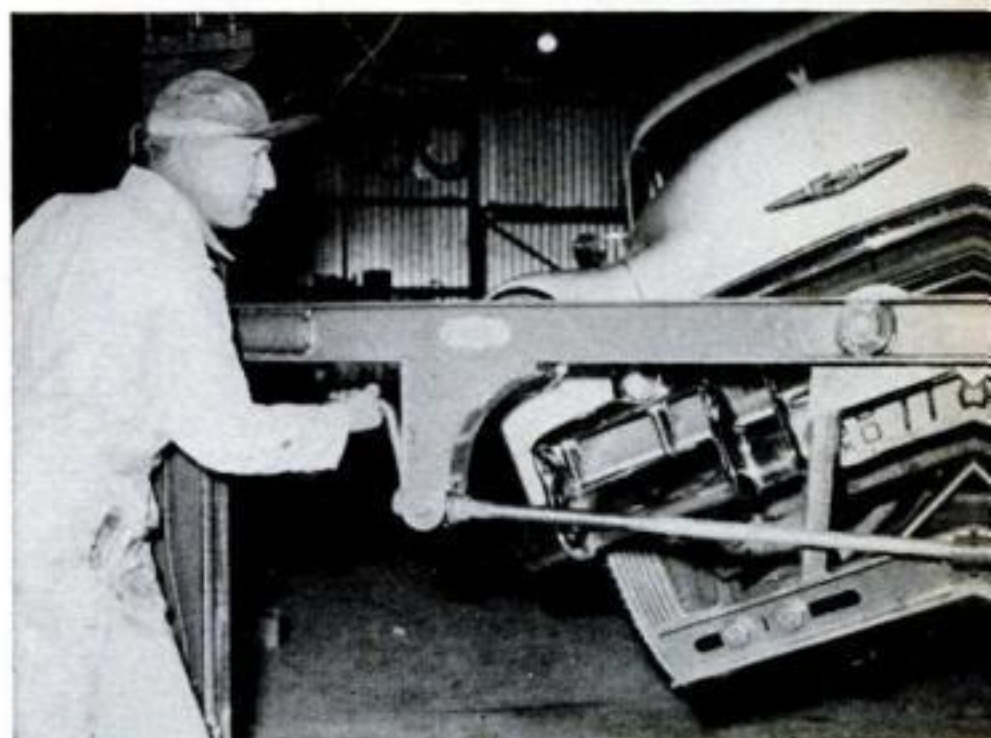
THE long aluminum pipes that irrigate many farms are called "portable" but it usually takes a whole crew to move one. Now special wheels let the farmer do the job alone. The irrigation pipe (left) forms the axle for metal wheels spaced 40 ft. apart. Turning a ratchet drive at the center wheel with a detachable handle makes the whole line move. This way, one man can roll $\frac{1}{8}$ of a mile of pipe. Stout-Wyss Irrigation, Inc., Portland, Ore., makes the system.



Car Tilted for Easier Servicing

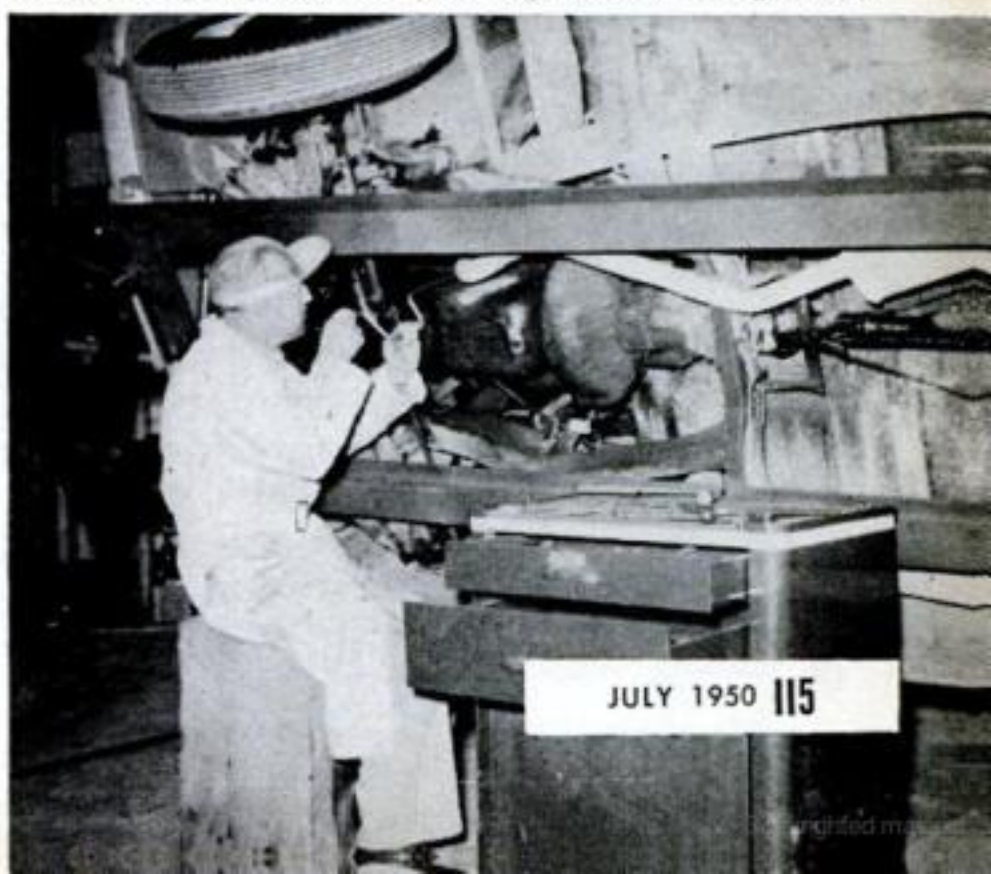
HANDLING major car repairs without getting into a dark and greasy pit is now possible with this automobile "barber's chair," invented by Carlyle Hall of Berkeley, Calif. The car is driven into the Kar-Jig over a short ramp, and the chassis clamped to the two long steel beams. Then $\frac{3}{4}$ -hp. motors spin screw jacks in the corner posts to raise the car to a comfortable working level. Tilting the car brings parts needing service within easy reach. A pair of detachable davits swings heavy parts into place.

Adjustable clamps hook over frame or bumper extensions and lock car against rails. Adjustable strut (in back) takes part of load.



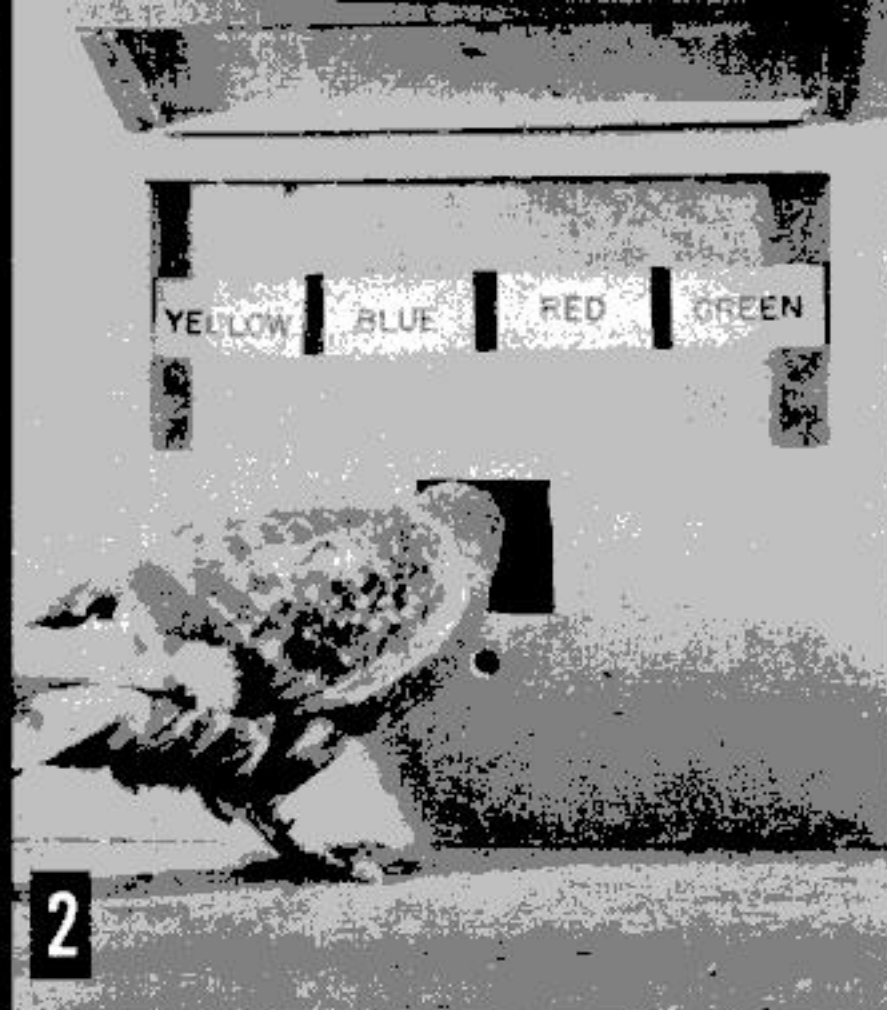
Crank tilts car up to 85° either way. It's usually tilted so gas and oil fillers are up. Most batteries retain acid at 70° angle.

Sitting down on the job means faster work in better light, greater comfort. Many engine, transmission, and rear-end repairs are simplified.





THIS PIGEON would go hungry if he were color blind. Bulbs in box at top cast different colored lights on the bird. In photo No. 1 the pigeon is bathed in yellow light. Being a smart bird,



he responds by pecking at the panel with the word "yellow" on it. A feeding trough opens, and in photo No. 2 he collects his reward. Lights change color after each feeding.

Harvard Trains Pigeons To Work for a Living

Photos by Walter Fleischer

WHAT'S the best way to persuade a man to work harder? Can you train a child better by punishing him when he misbehaves or by rewarding him when he's good?

Looking for answers to questions like these, a Harvard scientist has taught pigeons to work for their food, to cooperate with each other, to match colors, to play ping-pong, and to peck out tunes on a piano.

The pigeons learned these tricks while serving as subjects for a series of experiments being made in the Psychological Laboratories of Harvard University, at Cambridge, Mass., to find out why people act the way they do. The experiments were worked out by Dr. B. F. Skinner, professor of psychology, as classroom demonstrations to test his theory that reward is more effective than punishment in getting people—or pigeons—to perform tasks.

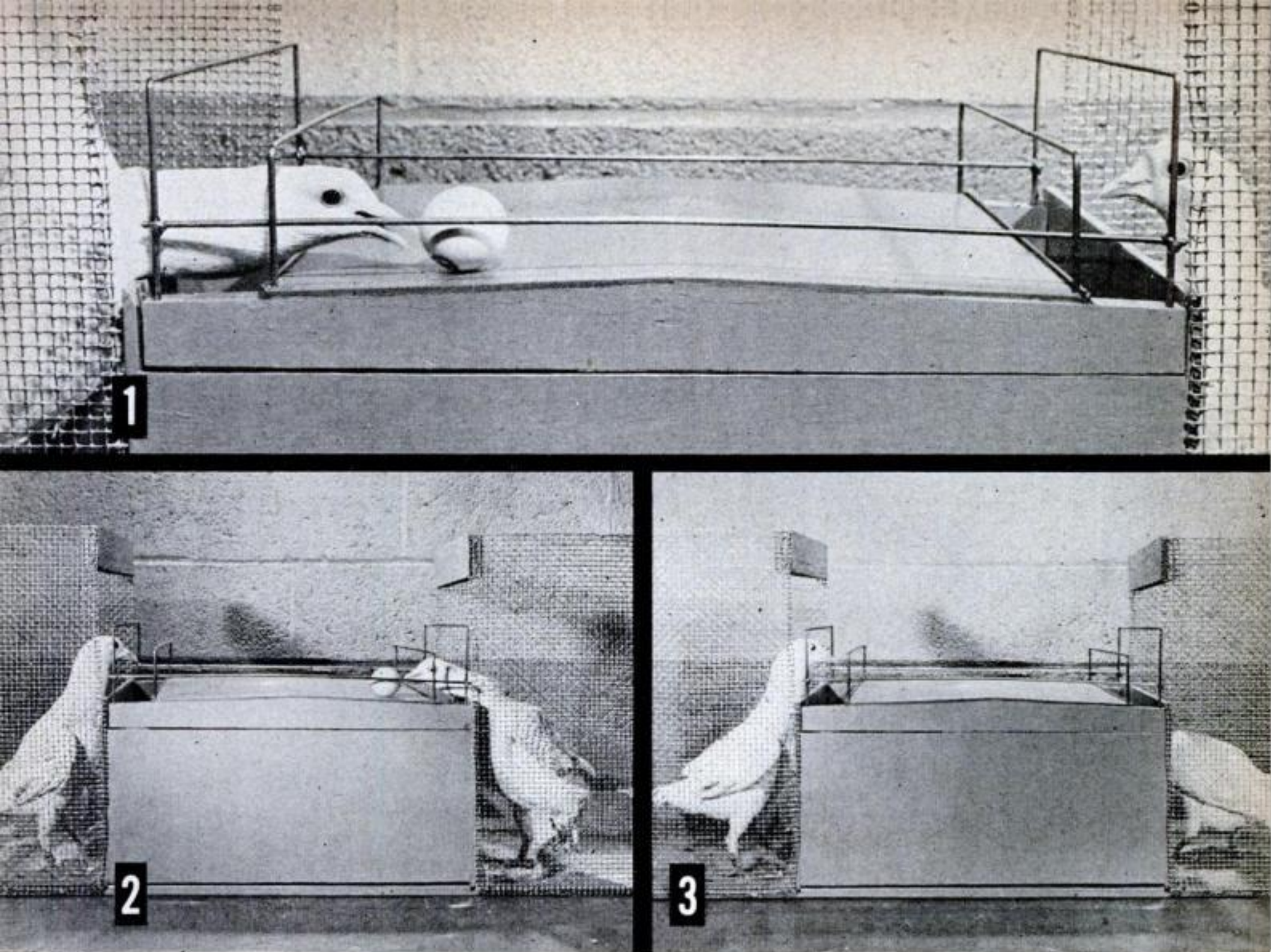
He picked pigeons because they live longer than other laboratory animals—up to 15

years, compared with only two or three for rats—and are less susceptible to disease. Also, pigeons have about the same reaction time as human beings and have good color vision. He now has several dozen at work.

Basically, all of Professor Skinner's experiments involve getting a pigeon to go through some action to receive a reward. The reward in each case is a chance to peck at a bit of food for a couple of seconds. In different experiments, pigeons must learn to cooperate or to compete to win the food.

One of the experiments requires a pigeon to do a certain amount of work to get food. This, explains Professor Skinner, is similar to offering an incentive to a wage-earner. With pigeons, at any rate, a high output can be obtained with very little pay if the schedule of pay-off is right. One pigeon, for example, pecked over 35,000 times in a five-hour period for one third of an ounce of food.

Another demonstration shows that pigeons can be taught to cooperate with each other to get food. (Pictures on page 118.) In an-



PING PONG, PIGEON STYLE. The ball is placed in the middle of a table sloping toward each bird. Player at left in photo No. 1 gets first bat at the ball. Photo No. 2 shows his opponent poised for an expert return. Rallies may go on for three or four returns until, as in photo No.

3, bird at left misses, and the ball falls into a trough in front of him. This opens a feeding station in front of his opponent, who ducks to peck at his prize. Since pigeons are not always good losers, guard rails prevent an excited bird from attacking the victor.

other (pictures on page 116) a small brown and yellow pigeon illustrates both that pigeons can distinguish colors and can act in different ways in response to different colors. The apparatus for this experiment is a semi-circular cage with bulbs in a box at the top that throw green, blue, red, or yellow lights on the bird.

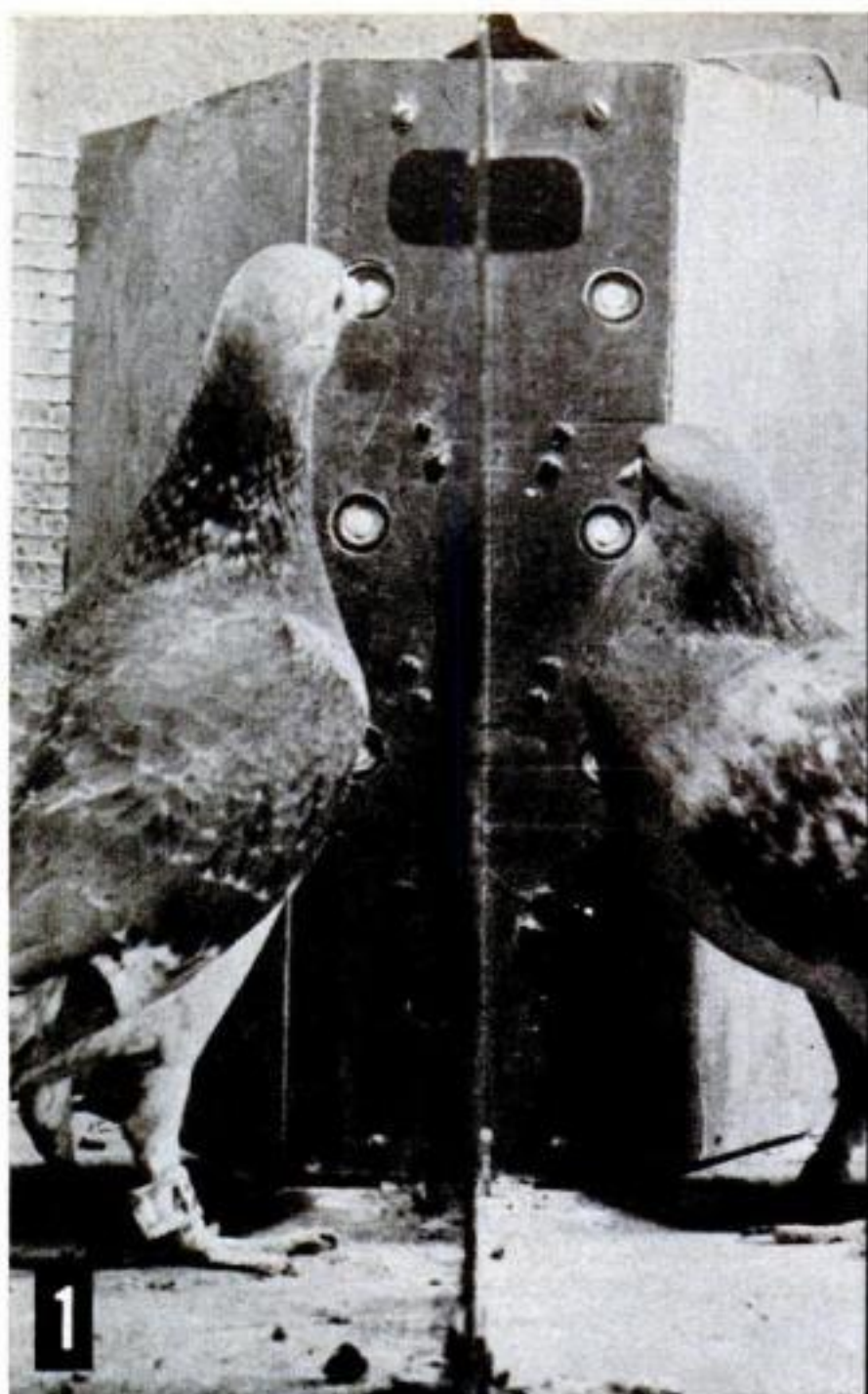
Pigeons can also be taught more complicated tasks. One advanced lesson is playing a tune on a piano of seven keys. By rewarding the pigeon when he strikes the keys in a certain sequence, Dr. Skinner and his assistants have taught pigeons to play simple tunes such as "Over the Fence is Out, Boys," and "Take Me Out to the Ball Game."

In still another of Professor Skinner's exhibits, which demonstrates competition, the birds play a modified game of ping-pong. (Pictures on this page.) The court is con-

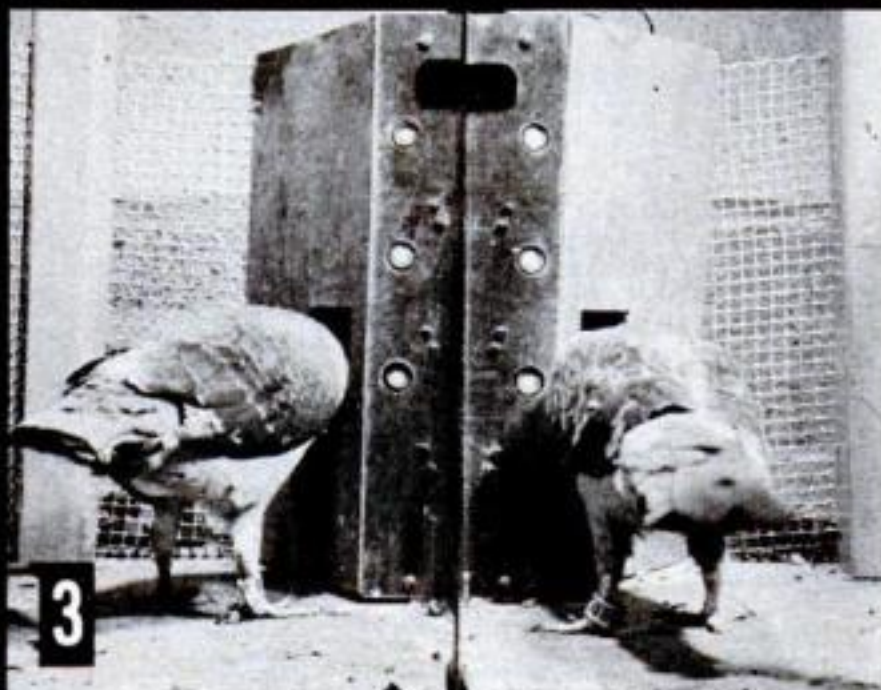
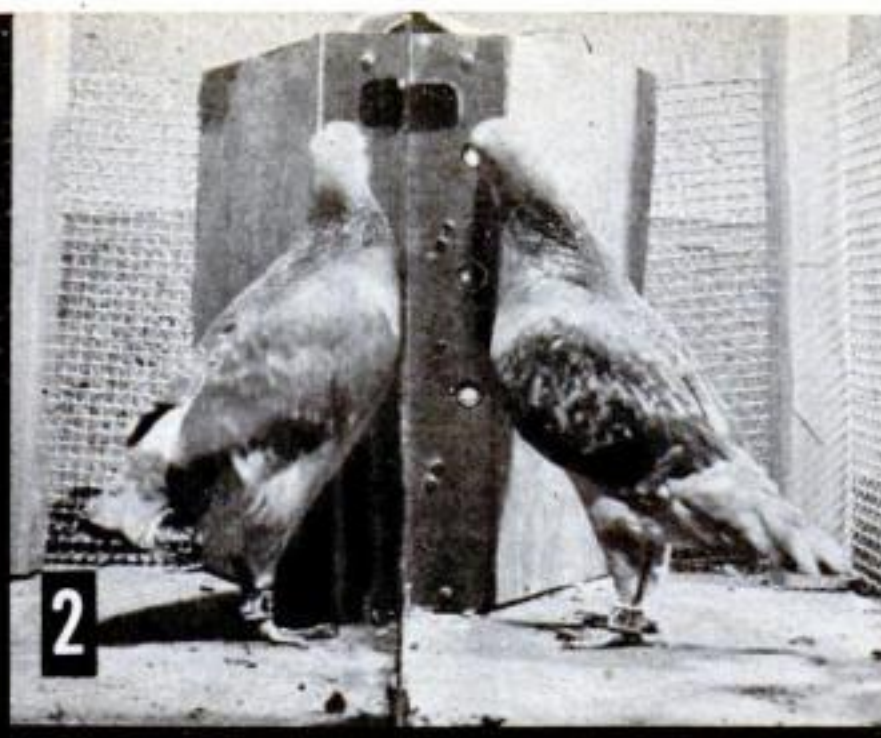
siderably smaller than regulation size, being about two feet square, and has no net. One pigeon, using his beak, tries to bat the ball past his opponent. Rallies sometimes go to three or four shots but most of the shots are "aces." The winner is rewarded with food after each shot.

Pigeons in some experiments develop an ability to "tell time." If an apparatus will pay off only 10 seconds after a signal, the pigeons learn to wait. They may turn around once or twice, hop from one foot to another, or pick at other parts of the box in order to kill time during the 10 seconds.

Also, like human beings, pigeons are superstitious. They will tend to repeat any action that they may have happened to be doing when food arrived in the past. Some may build up a complicated rigmarole of movements just as a poker player may walk around his chair for luck. The pigeon will



PECKING AT PUSH BUTTONS for their dinner, two pigeons are separated by a pane of glass dividing their cage. After trial and error pecks in photo No. 1, the birds get together, and in photo No. 2 peck at matching buttons at the same time. They've hit the jackpot, opening



two feed doors through which they are shown grabbing grain in photo No. 3. To make it harder, the panels can be rigged so that only one of the three matching sets of buttons will open the food doors. Pigeon push-button co-operation takes two to three weeks' training.

continue to go through his routine even though this has no effect on the delivery of food.

Although Professor Skinner usually works with homing pigeons, he has found that park pigeons or the Harvard Yard variety are just

as good subjects. One of his best birds, in fact, was a pigeon he captured on a window ledge outside his laboratory. Put to "school," the pigeon was soon playing tunes and batting the ping-pong ball as well as any of the other birds. END

Science Sleuth Finds New Sugarless Sweetener

THE curiosity of a young chemist, who paused during an experiment to trace down a sudden sweet taste in the cigarette he was smoking, has led to the marketing of the first noncaloric sweetening agent that can be used in cooking, baking, and canning without loss of sweetness.

By promptly tasting all the chemicals on his laboratory bench when he noticed the strange sweet taste, Michael Sveda, then a student at the University of Illinois, tracked it to a new compound, called sodium cyclo-

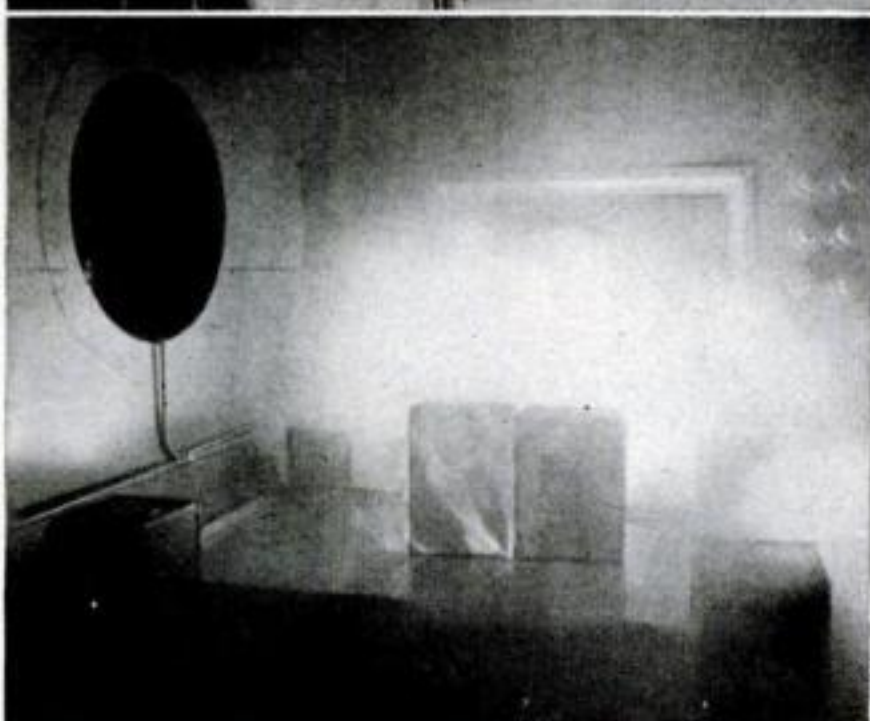
hexyl sulfamate, that he had synthesized.

Now, 13 years later, Abbott Laboratories, of North Chicago, has begun producing the stuff under a patent license. It will soon be sold in drug stores, as effervescent tablets, under the trade name Sucaryl Sodium.

Abbott officials say its chief advantage over saccharin, the only other noncaloric sweetener, is that Sucaryl does not decompose during cooking. Thus it makes possible a more varied menu in diabetic, reducing, and other restricted diets.



Inside heavy-walled chamber above, packages are ready for simulated flight that will tell how well they withstand plane vibrations, temperature changes, and high-altitude pressures.



Here's one package (left) that will never see the inside of a real plane. Unable to take it, the contents burst into flames; but better packaging will prevent it from happening again.

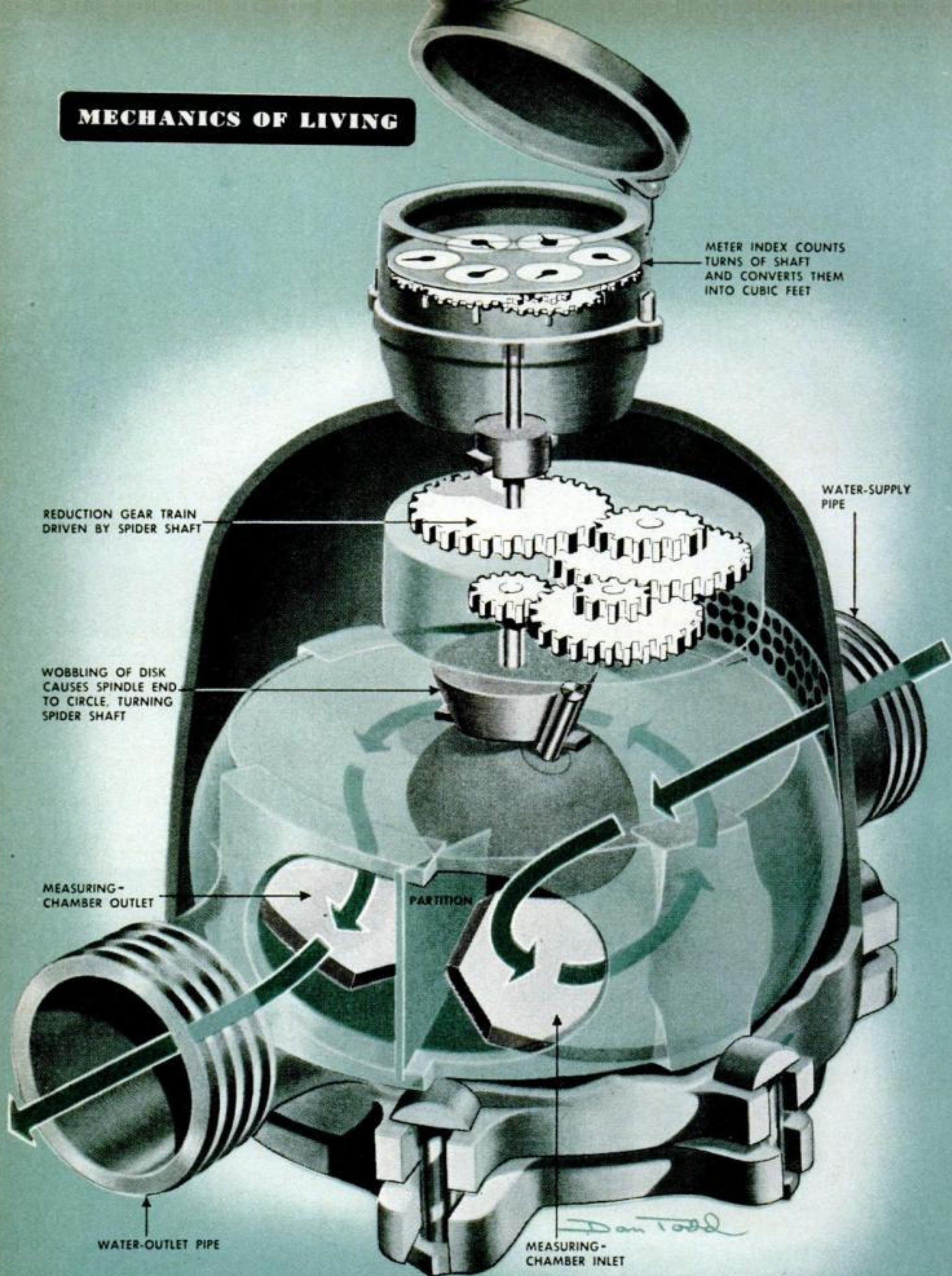
Putting the Heat on Hot Cargoes

WHEN planes carry dangerous packages of acid, explosive, or flammable substances, a sudden jolt or a change in temperature and pressure can result in a tragic accident. Now experts can find out beforehand whether packages can take it: a rough ride in a test chamber simulates actual flight conditions. Temperature and pressure inside the chamber, developed by the Air Materiel Command at Dayton, Ohio, can be varied from sea level to 50,000 feet in three minutes. A vibrating table gives the packages all the jars and jounces they would get in a plane. If they come through all this without breaking, burning, or blowing up, they are considered safe for shipment. If not, better packages are developed that will give their contents kid-glove care.



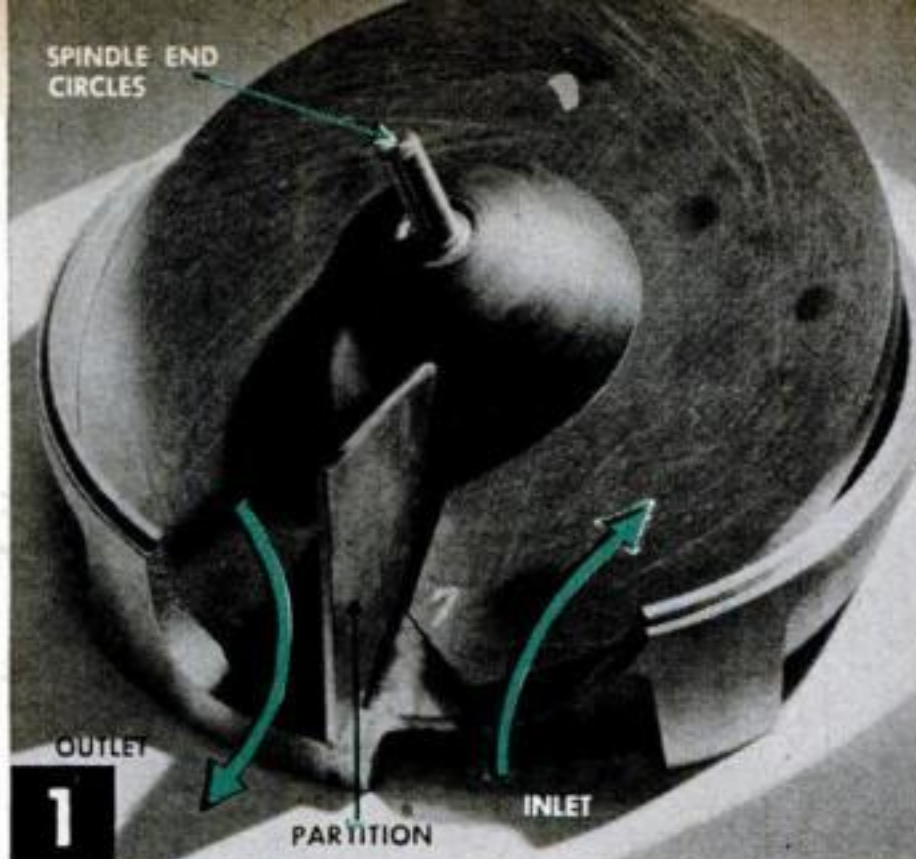
Tough, flexible bottles of polyethylene plastic, now required for all air shipments of acids as result of tests, take rough beating, as shown in stroboscopic photo above, without breaking.

MECHANICS OF LIVING



Drawing shows gear arrangement that registers water measurements on dials. The wobbles

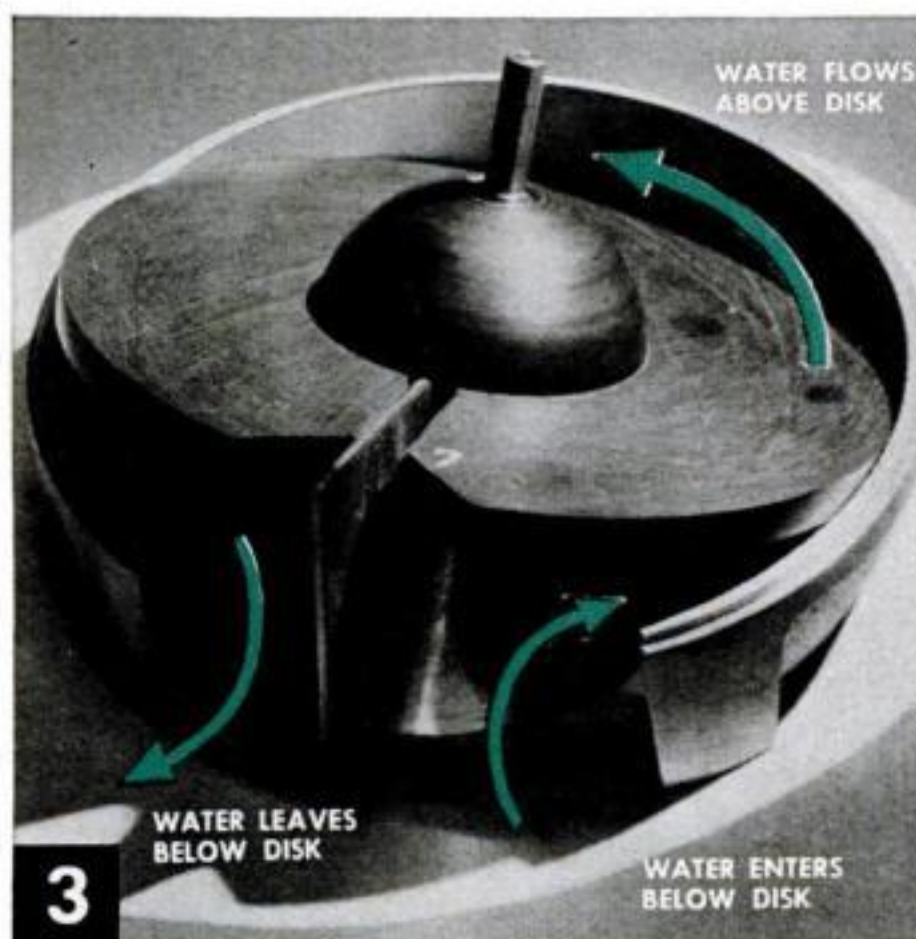
of disk spindle engage teeth of shaft above and rotate it. Gears transmit information to dials.



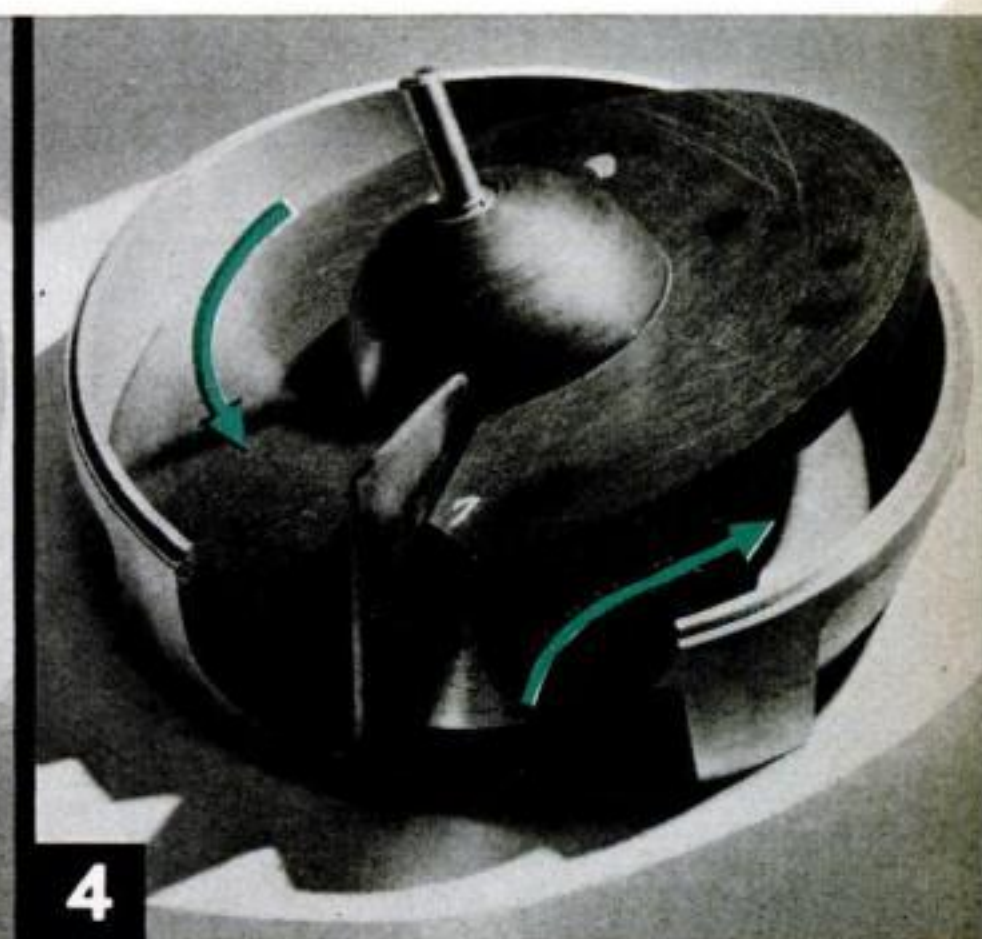
Measuring cycle begins with the disk tilted toward intake. Water flows in and fills the space above the tilted disk. Wall separating intake and outlet fits into a slot in the disk.



Here the pressure of the water above the disk has begun to tilt it away from the intake, allowing more water to enter, this time *below* the disk. Top of spindle has begun rotary motion.



The pressure of the water below the disk continues to force its edge upward at intake. This increase in the tilting motion causes the water above the disk to continue flowing toward outlet.

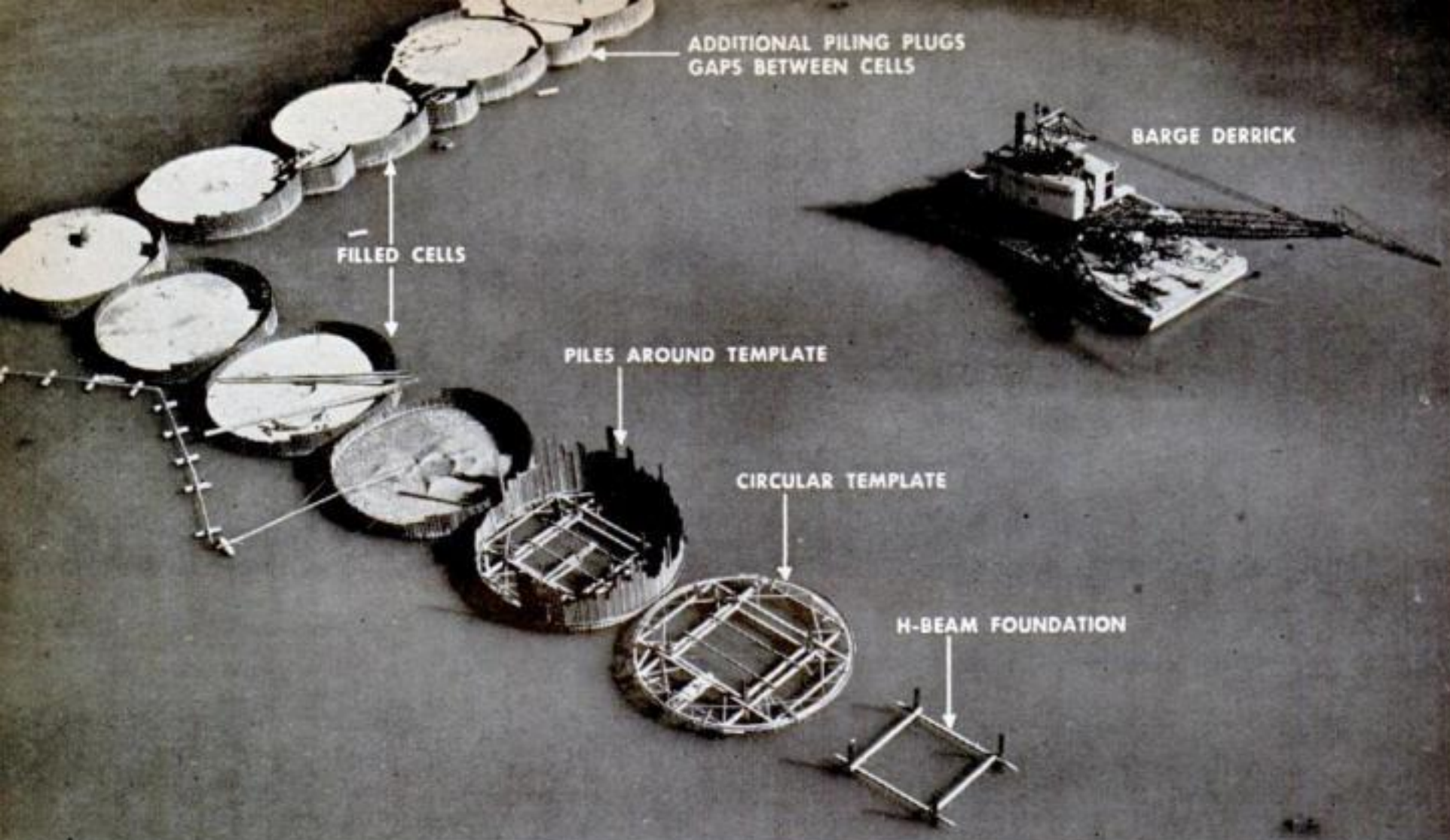


Here the cycle of the water above the disk is almost complete. Disk has tilted almost enough to allow water to run through outlet. Then more water enters above disk and cycle begins anew.

How Meter Keeps Tabs On the Water You Use

EVERY time you wash your car, water your lawn, or take a shower, this little gadget in your basement works overtime. In your water meter, the wobbings of a hard rubber, topline disk are translated, through an ingenious gearing arrangement, into

cubic feet of water registered on dials. And, because you pay for the water you use, meters help your community save water and avert shortages. The photos and drawing on these pages show you how one of the common types of meters works.

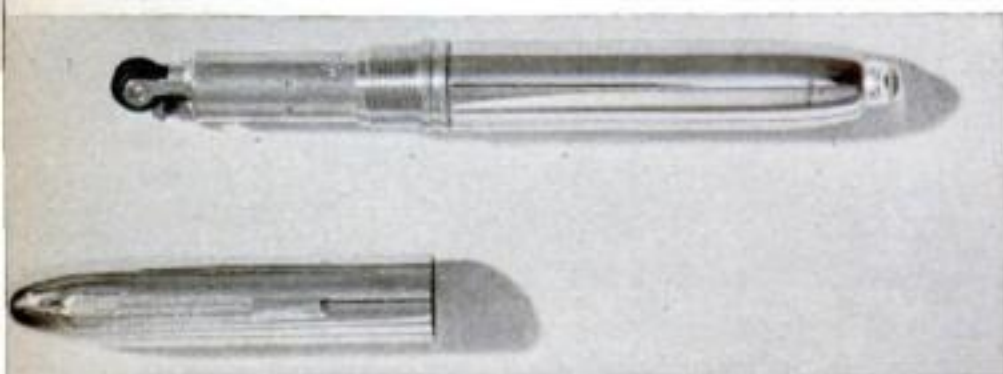


Sand-Filled Cells Make New California Sea Wall

THESE strange-looking, tanklike objects are a new kind of sea wall. Part of a \$100,-000,000 harbor-expansion project at Long Beach, Calif., the circular cells consist of rings of special interlocking steel piles filled with dredged sand and muck.

Designed to withstand the batterings of tides and waves for centuries, the wall contains 44 of the steel cells, each 62 feet in

diameter, forming a breakwater 2,780 feet long. Each cell begins on a foundation of four sunken H beams, as shown in the foreground. Over this is laid a circular template around which the piles are driven. When the piling is complete, the template is removed and the cell filled. The wall was designed by harbor engineer R. R. Shoemaker. The piles were made by Bethlehem Steel.



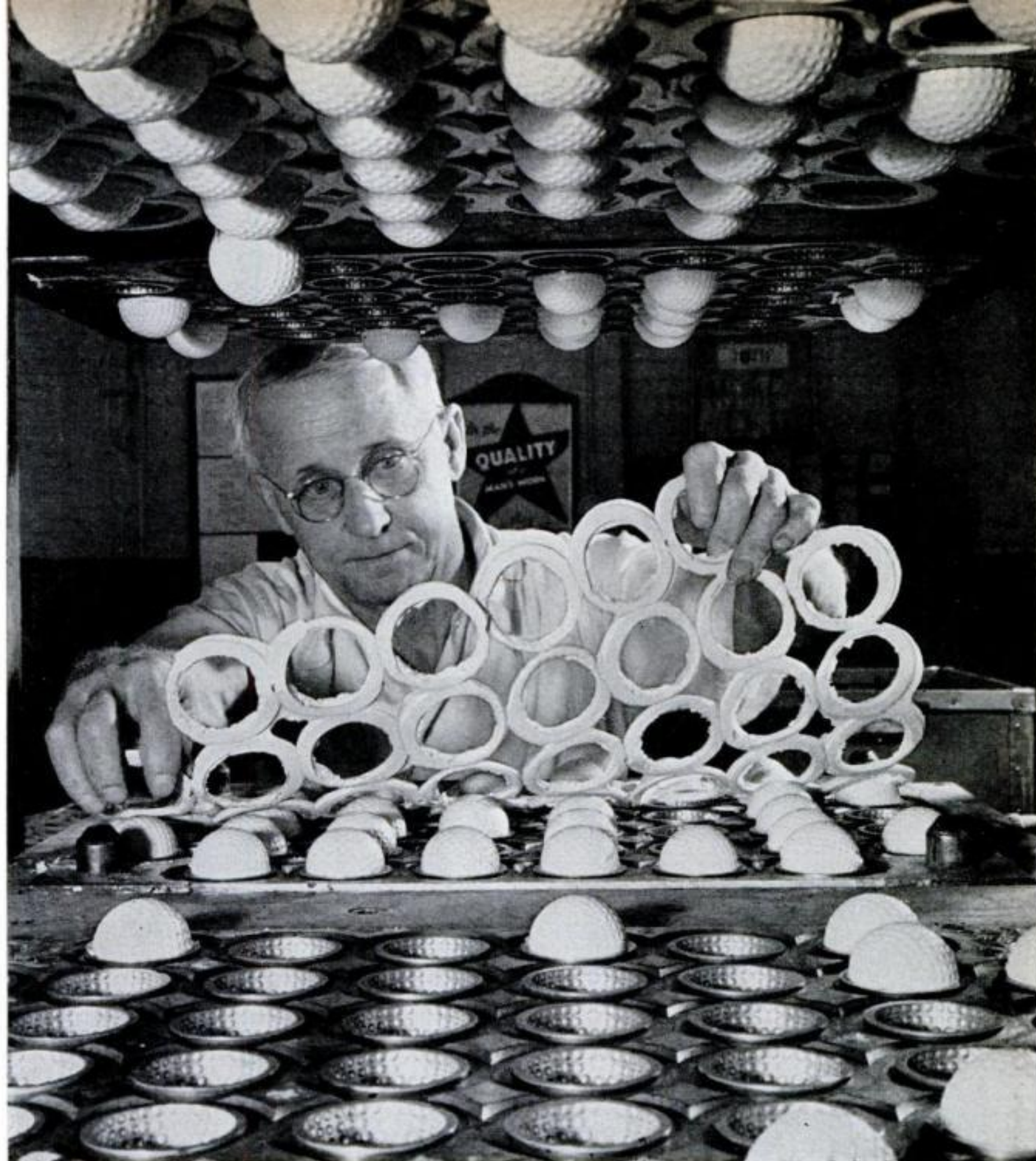
Flashlight Sports Lighter

THIS pen-size Flash-Liter gives you two kinds of light—a miniature flashlight on one end and a cigarette lighter on the other. Twisting a ring in the middle turns the flashlight on or off. Studwell Products Co., of New York City, sells the gadget for \$1.



Britain Gets New Jet Fighter

LATEST addition to Britain's Royal Air Force is this sleek, twin-tailed De Havilland jet interceptor, direct descendant of the famed Vampire. Called the Venom, it is powered by a De Havilland Ghost jet engine, the same type that powers the new Comet all-jet air liner (PS, May '50, p. 98). With its new engine developing a static thrust of 5,000 pounds, the Venom has two-thirds more power than the Vampire. This, plus changes in its airframe, gives the Venom a greater speed, faster rate of climb, and higher ceiling than its predecessor.



Dimpled cover extends a golf ball's flight. A smooth ball wouldn't travel more than 125 yds.

Golf Balls Get Built-In Zip

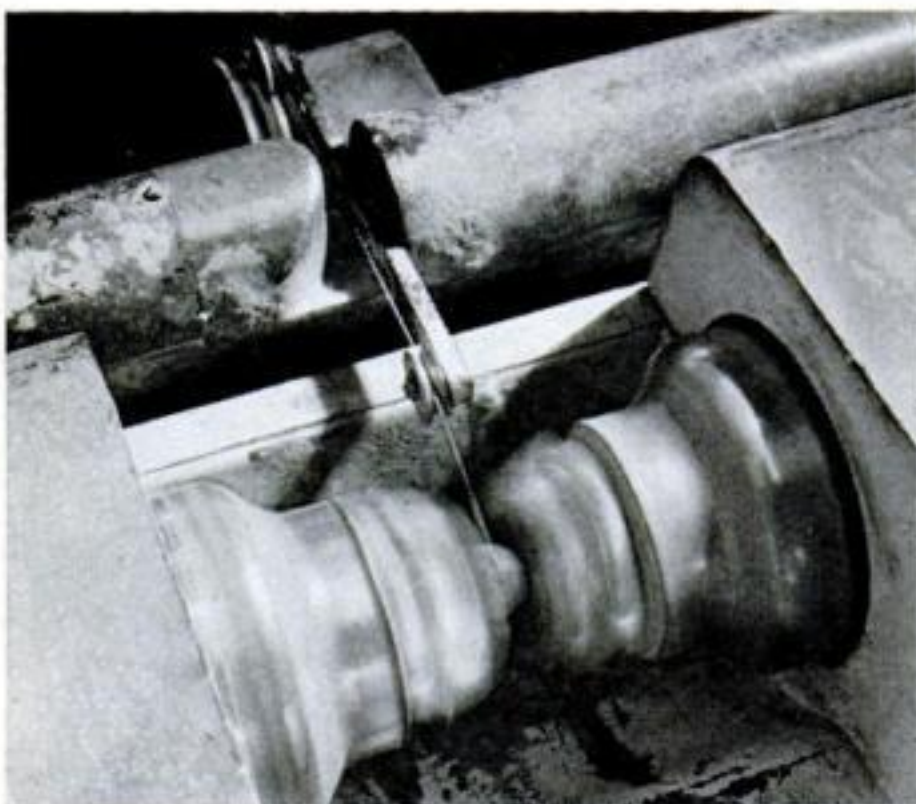
GOLFERS buy more than 26 million of the little white dimpled pills every year. And to meet the exacting demands of the game's perfectionists, they must be precision built—from core to cover. Even the dimples on the golf ball's cover are the result of extensive aerodynamic tests. A variation of as little as .001 inch in dimple size, it has been found, can materially shorten the flight of a ball. Newest development in golf-ball making are a silicone center instead of an oil center, and electronically controlled winding. Photos on the following pages show some of the 131 operations that go into making golf balls at the Providence, R. I., plant of the U. S. Rubber Co.



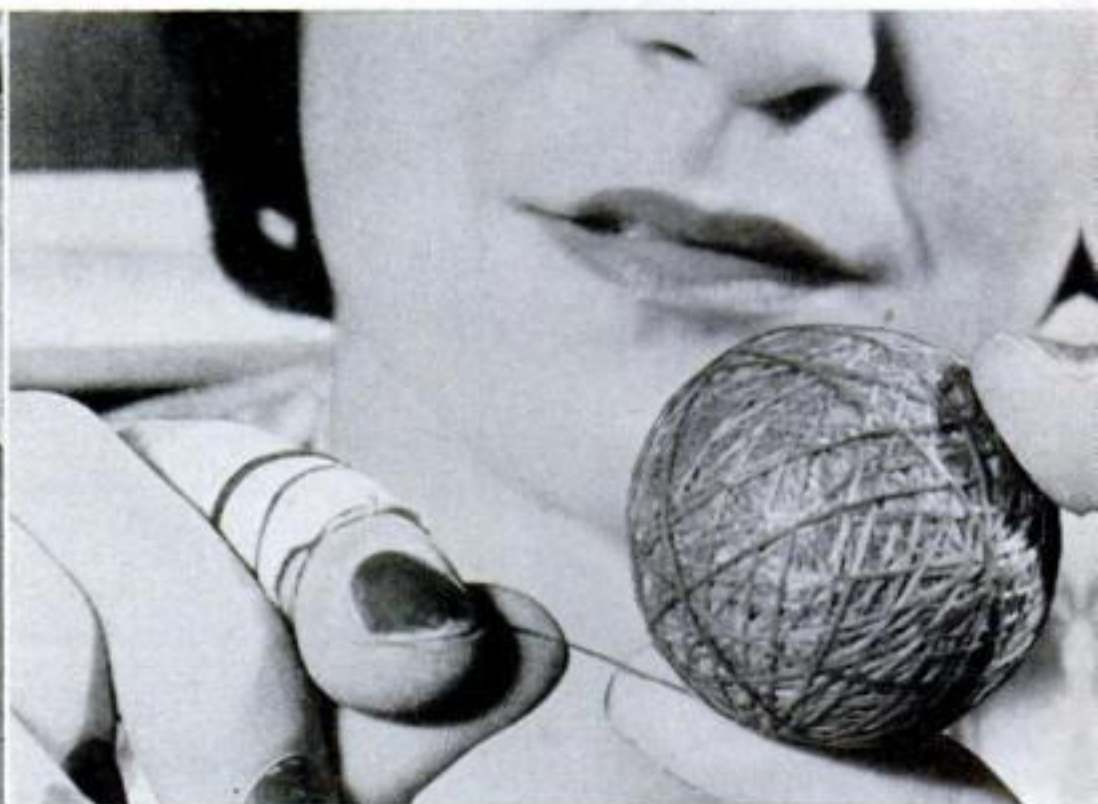
1 **Silicone**, a new substance made from sand that has more bounce than rubber, is used for the centers of "U. S." golf balls. The pea-size centers are stamped out in a press.



2 **Biscuits** of Sumatra rubber are placed in a mold to make halves of jackets for silicone centers. Twenty different materials from all parts of the world go into a good golf ball.



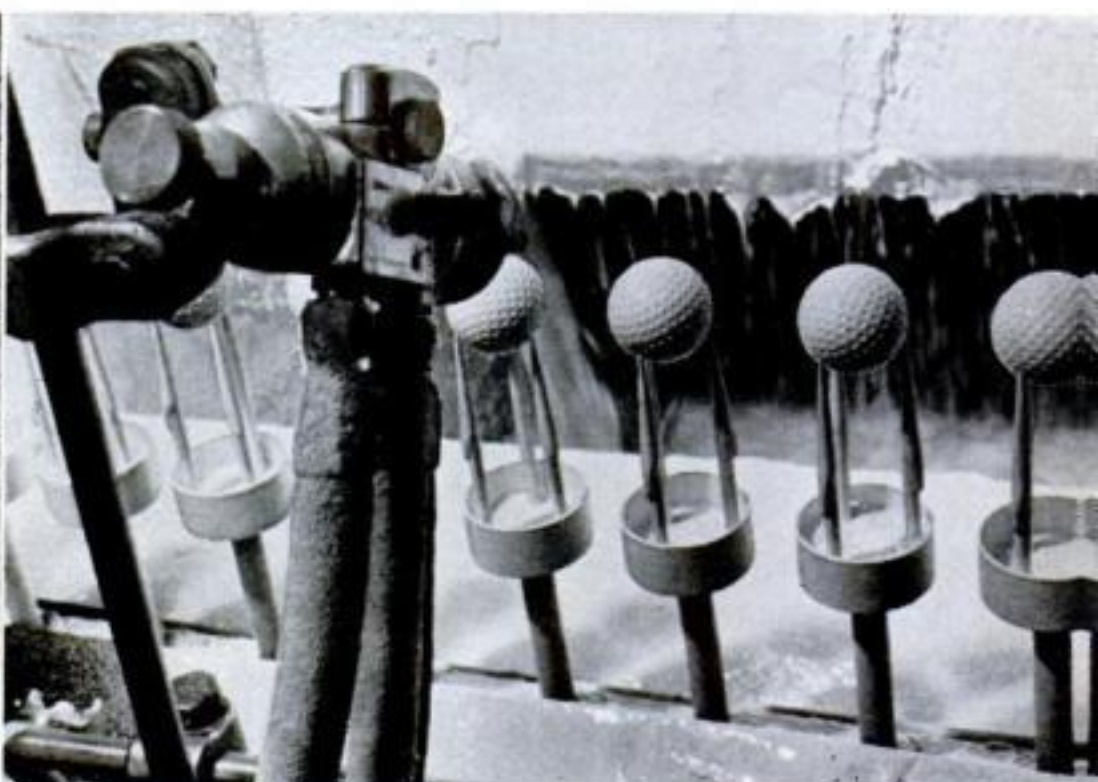
5 **Electronic winder** applies rubber thread to silicone and rubber core. Electronic device, reacting to vibrations of thread in front of photo cell, maintains right tension.



6 **Top-grade ball** contains about 30 yds. of rubber thread stretched to nine times its original length. Energy stored in thread is enough to lift 155-lb. man a distance of 2 ft.



9 **Inspection** of covered balls is one of 100 checks made during their manufacture. A finished ball must not weigh more than 1.62 oz. nor have a diameter larger than 1.68 in.



10 **Plastic enamel** gives ball a coating that will stay white, retain its gloss, and be easy to clean. Three coats are applied in special automatic paint-spraying machine.



3 **Joining the halves.** With the tiny silicone centers in place, the two halves of the jackets are next joined to form small rubber balls. Heat and pressure do the trick.



4 **Finished cores** consisting of the silicone hearts encased in the cushioning jackets, removed from the press, are then trimmed and smoothed before going to the winders.



7 **Tough outside covers** go on next. These are made of balata rubber from Brazil. The first golf balls consisted of a three-piece leather cover stuffed with dampened feathers.



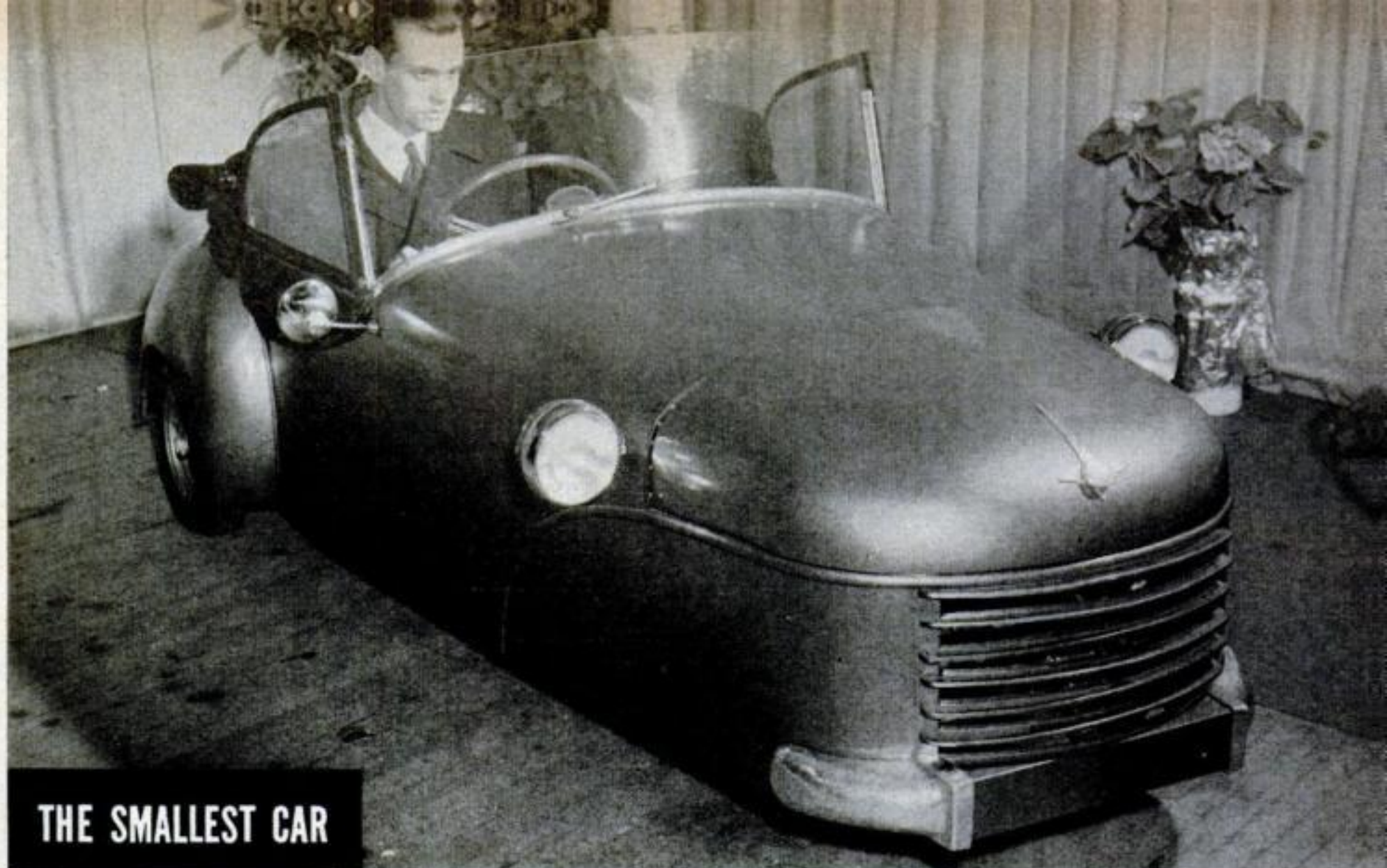
8 **Covered balls**, complete with the dimples that give them a grip on the air, come from the big molding press, which is first heated, then cooled, to insure proper vulcanization.



11 Each enamel coat is allowed to dry for 18 hrs. before the next coat is applied. Balls are picked off the painting line with tongs and placed on racks for each drying.



12 **Marking.** After the trade name "U. S. Royal" has been stamped into the cover of the ball, paint is applied to the imprint. Next stop—the grass on some golf course.

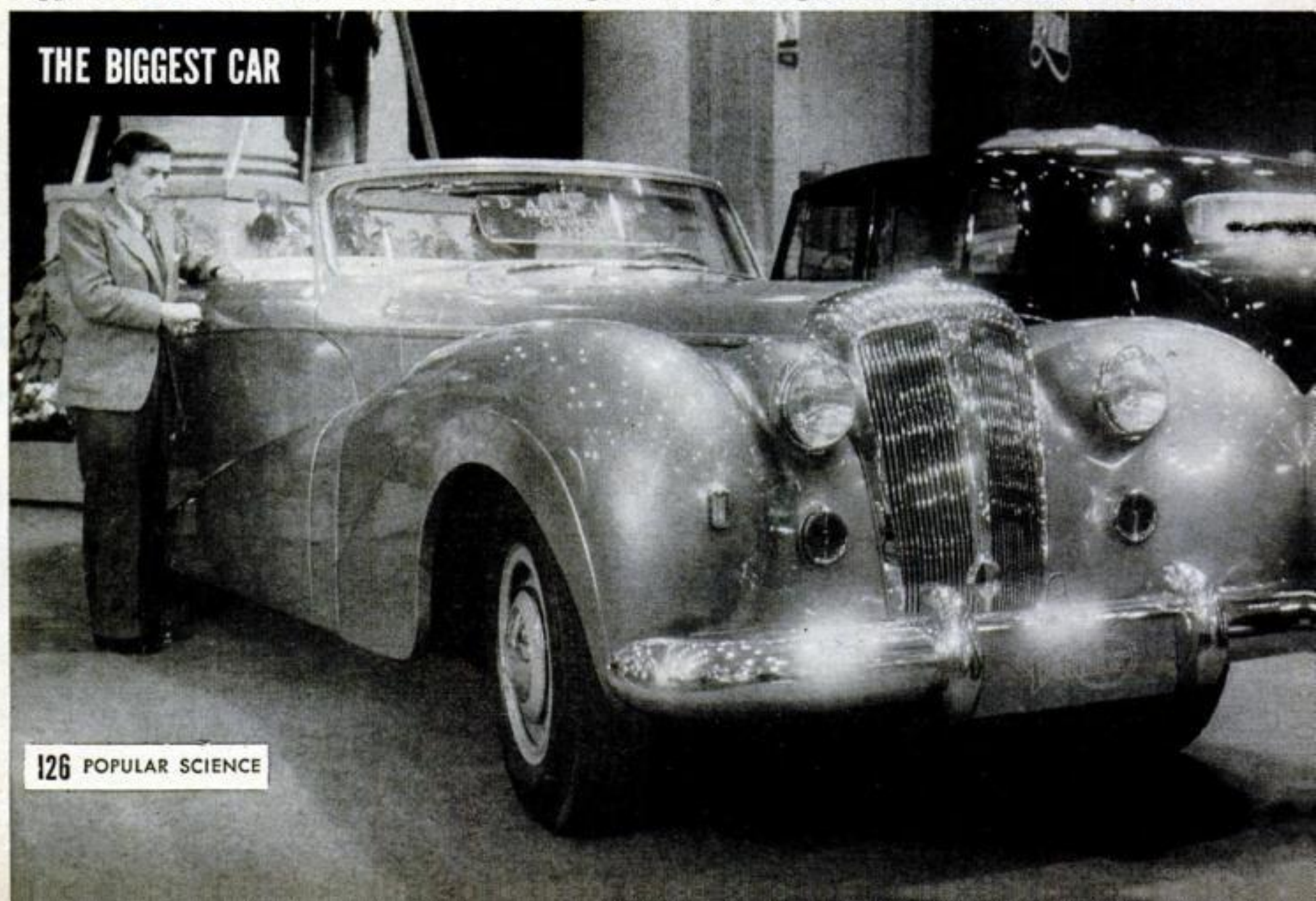


THE SMALLEST CAR

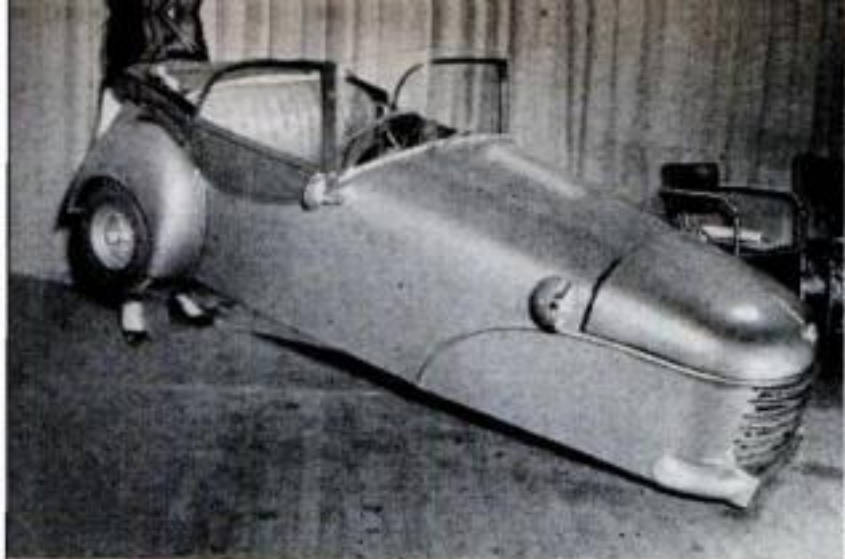
Bond 3-wheeled Minicar, smallest British auto sold in U. S., gets 85-95 miles to gallon of gas.

What's Different about

Biggest car is Daimler convertible—240 in. long, 77 wide, 67 high. Price is more than \$13,000.

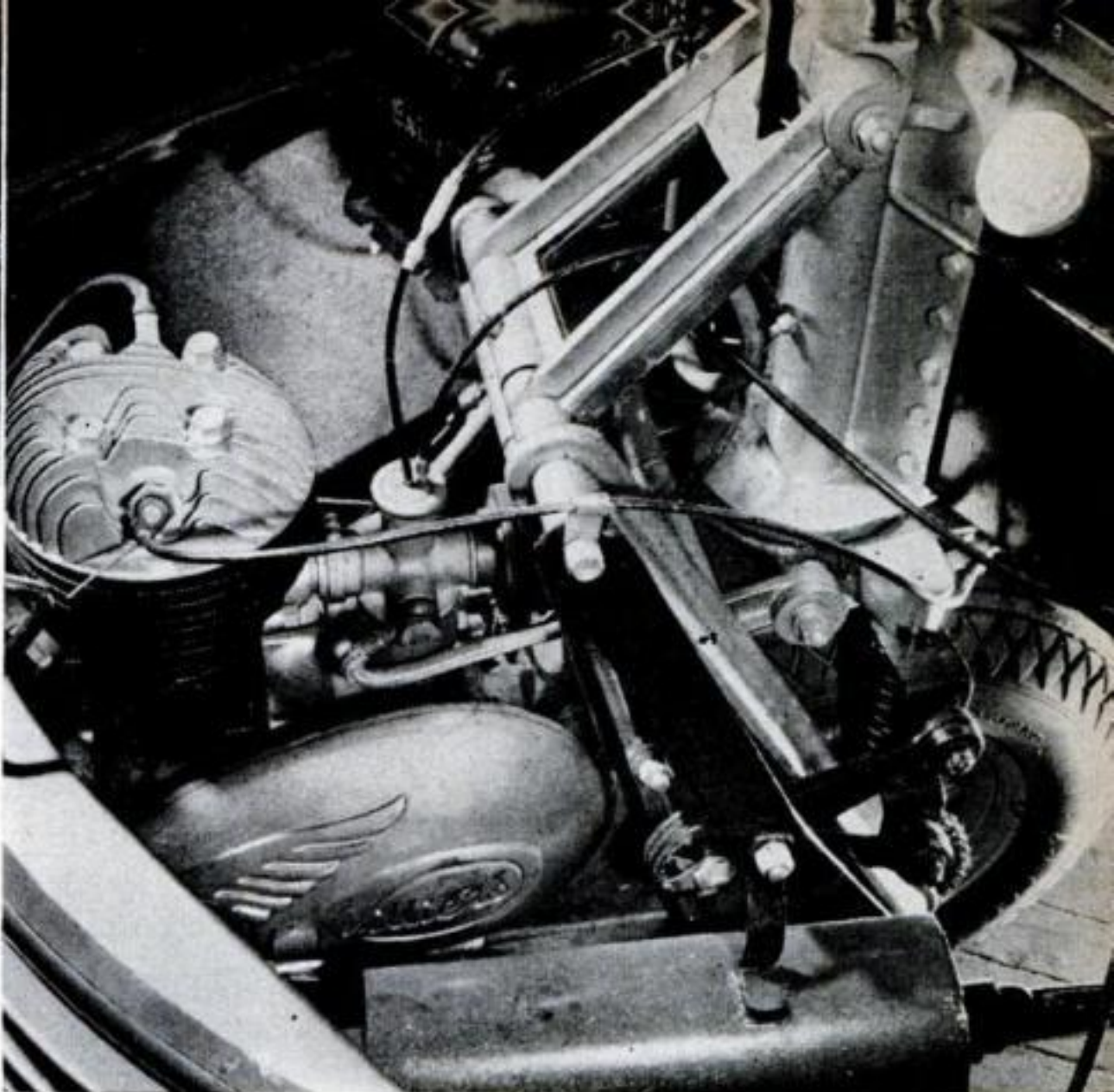


THE BIGGEST CAR



Rear of 340-lb. machine is lifted easily by a woman; aluminum is extensively used in its construction. Engine drives single front wheel. Rear wheels have separate axles for differential speed in turning. Car cruises at 40-45 m.p.h. Length is 104 in., width 55 in., height 42 in.

Single-cylinder engine drives wheel by chain and sprocket. Mounted on front-wheel support, it has 2 11/32-in. bore, 2 55/64-in. stroke. Like outboard motor, it is lubricated by putting oil in fuel. Car's gas capacity is 2½ gallons. It retails in U. S. at about \$950.



British Cars

By Devon Francis

PS Staff Photos

They range from dreamboats to mid-gets that drink petrol by the teacup, but they all have hand-crafted touches.

IF YOU take a good look around you on U. S. highways these summer days you will see cars that are unmistakably foreign. They're smaller. They're lower. They're shorter and frequently narrower. Some of them are sleeker and faster than the familiar Detroit product. Their styling, engine power, and prices are like nothing we are accustomed to.

And the chances are that socked into their metal, somewhere, is the label "Made in England." For America is undergoing the first real British invasion since the War of 1812. You can buy these cars on the installment plan in showrooms from coast to coast. The British need dollars, and selling their cars here is one way of getting them.

British cars *are* different. They are smaller—and some are bigger—than what we turn

out on this side of the Atlantic. Gas—or petrol, as the British call it—is more precious in England. And so the average car made there has a shorter wheelbase and far less poundage, to let them cut engine size and horsepower. Yet when the British set out to make a big car, they dwarf our Cadillacs and Lincolns.

British engine designers differ from their U. S. counterparts in several ways. They like small-bore, long-stroke engines. They have a fondness for overhead valves. They like to run their power plants nearer the "top of the curve" than is U. S. practice, with consequent need for four-speed gearboxes.

The springing on the better British cars is—let's admit it—far and away in advance of ours. The Lagonda perhaps is the best example of specialized weight suspension. The amount of unsprung weight on its rear wheels is fully a third less than it is on American cars. The story was told at the British motor show in New York last April that a man could drive a Lagonda over a

cobblestone street at 60 miles an hour without spilling a drop from a full glass of water placed on the rear seat. That may be stretching the truth, but the car's unique suspension in the rear takes most of the thump out of bumps.

Torsion-bar independent springing both front and rear is no novelty in British cars. There is no such thing in passenger cars on a U. S. assembly line.

In engines, the Jowett Javelin Jupiter is Britain's most radical departure from the conventional. This job has a flat engine of the opposed-cylinder type. It is a tiny power plant by U. S. standards, yet it develops a full 50 hp. at 4,100 r.p.m.

The British are great ones for souping up engines for sports cars. As in this country,

a motorist with a yen for something different can buy high-compression heads, special rear-axle gears to get more speed, and even kits to change side-valve engines to overhead-valve jobs.

There is a simple reason why the British appear to show more imagination in car design than we do. In fact, there are two. The first is that you can't produce a superduper car like some of the British jobs and keep the cost down. The second is that U. S. mass production calls for standardization.

In the process of cheering the British effort at motormaking, don't overlook what *we've* got that's different. Patterns of British gearshifting are a nightmare to an American accustomed to a standard shift. And the British offer no automatic transmissions.



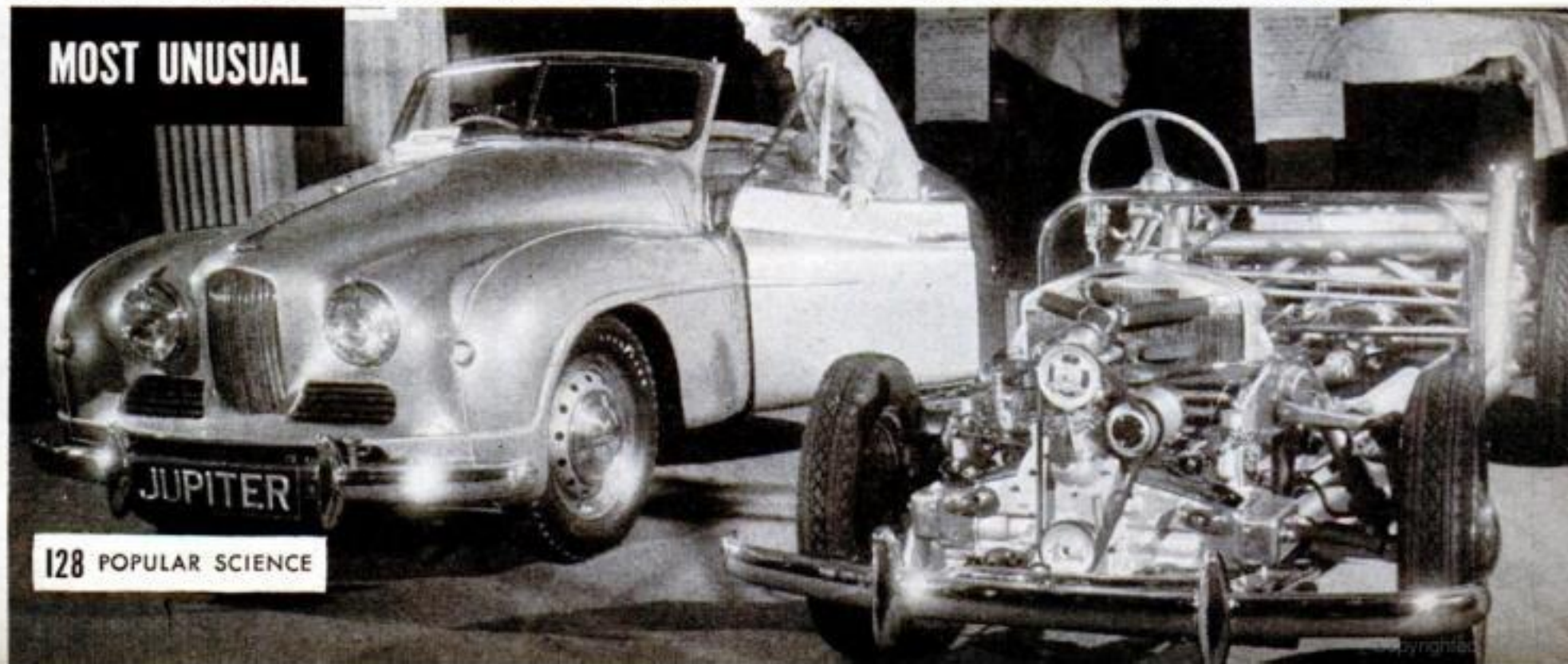
FASTEST

Jaguar is listed as fastest stock car in the world, having been clocked at 132.6 m.p.h. in a test. Priced in New York at \$3,945, this

Super Sports Convertible has a 6-cyl. engine with a bore of 3 17/64 in. and a stroke of 4 11/64. At 5,200 r.p.m., it develops 160 hp.

One of the best-looking British cars is Jupiter convertible, also with an 8-to-1 compression ratio and a top speed of more than 95 m.p.h.

Four-cylinder flat engine is forward of front axle, radiator behind. Wheelbase is 93 in., length 163 in. Price: \$2,548, including heater.



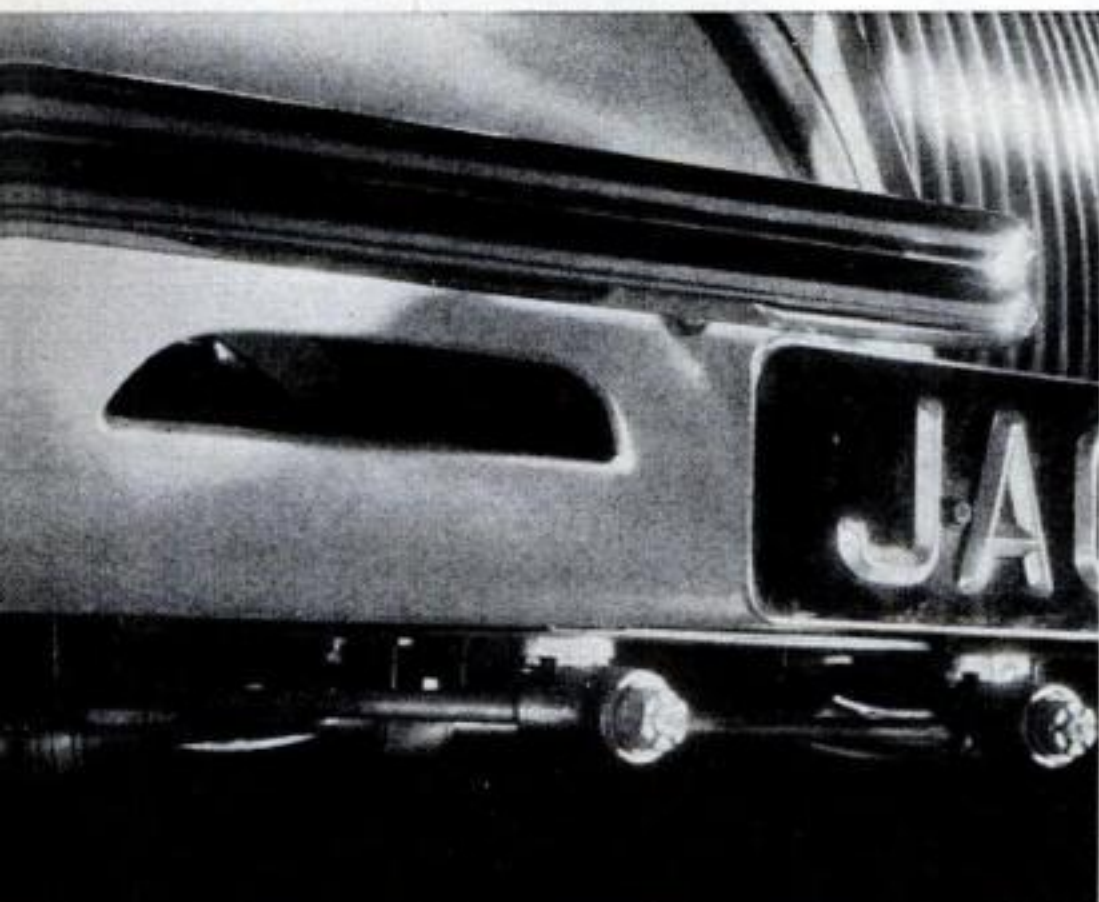
MOST UNUSUAL



SPORTIEST

Allard competition two-seater can be built from kit, uses many Ford parts. Chassis will take

various souped-up engines. Cost complete is \$3,245; without an engine, \$2,620.



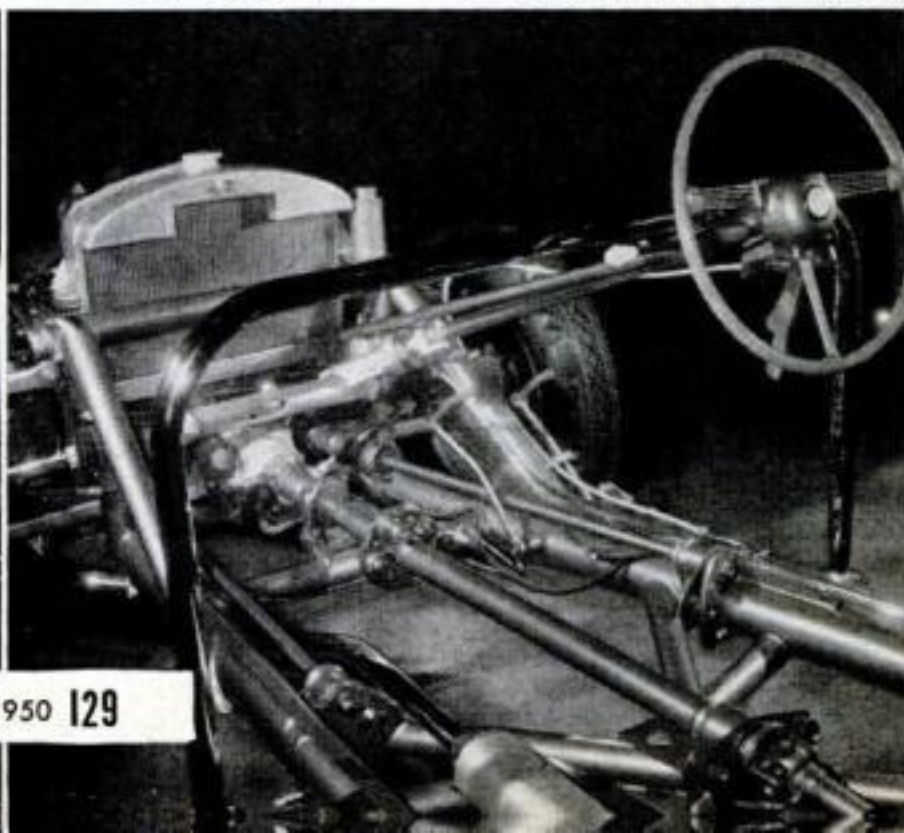
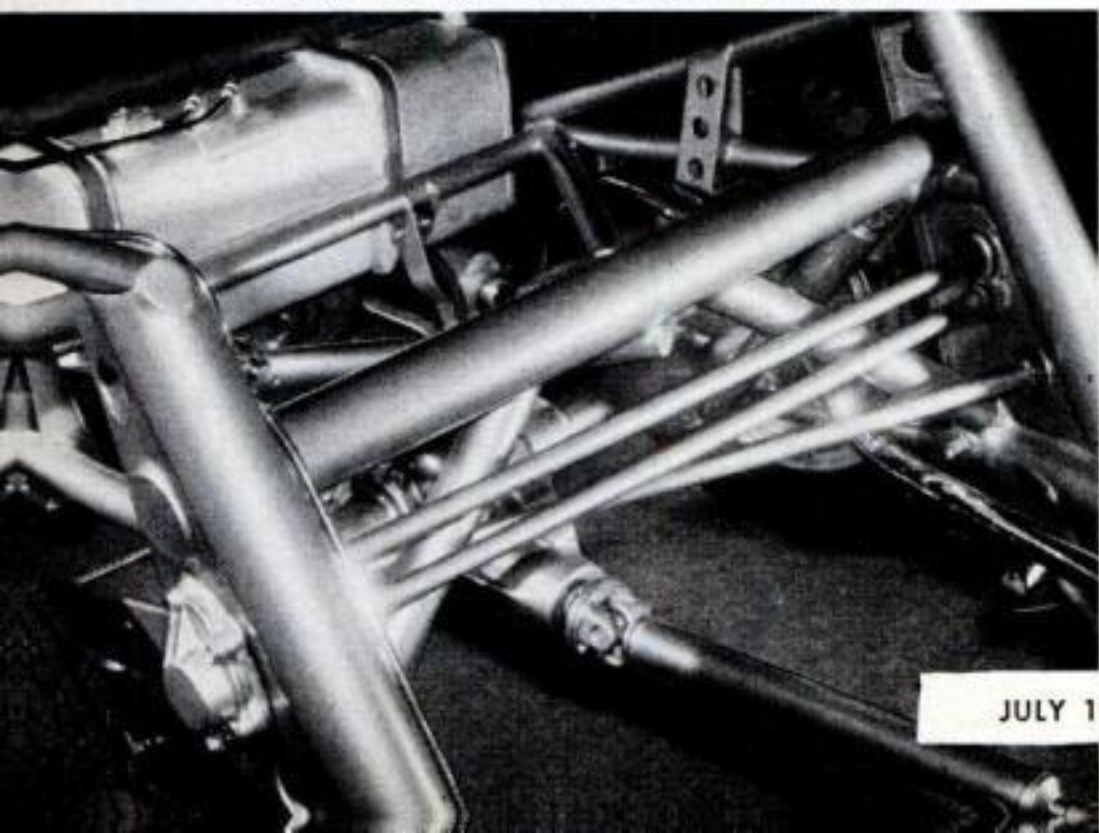
Jaguar's high speed calls for slotted fender apron in front to admit air for cooling brakes. Wheelbase is 102 in. and over-all length, 174.



In interest of clean lines, car's protection against rear collision is limited. Compression ratio is high by U. S. standards: 8-to-1.

Frame is welded tubing. Two small transverse rods under cross member are torsion bars for rear springing. Third bar is a stabilizer.

Between radiator and dash, Jupiter has only structural members, transmission, shaft, and steering column. *[Please turn the page]*

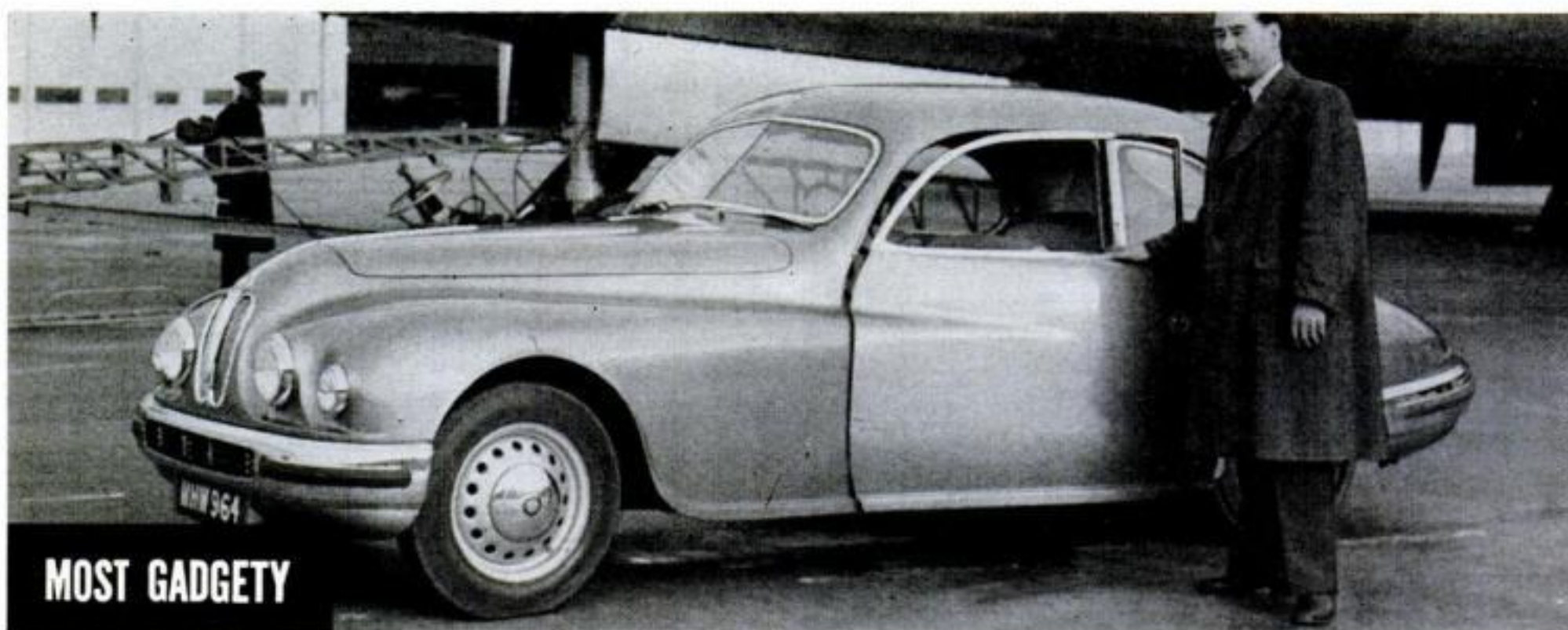




EASIEST RIDING

Independent rear-wheel suspension, low unsprung weight, give Lagonda exceptional riding qualities. Drive shafts protruding from differ-

ential (right) have two universals each and splined couplings that permit change in shaft length as wheels rise and fall over road bumps.

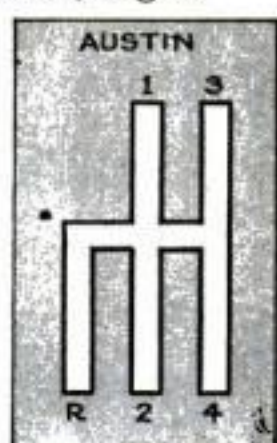
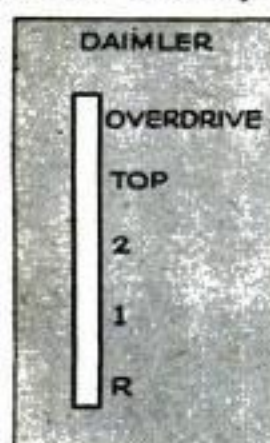


MOST GADGETY

Bristol sedan, made by same company that produced Brabazon, world's biggest passenger plane, has push-button doors; interior locking

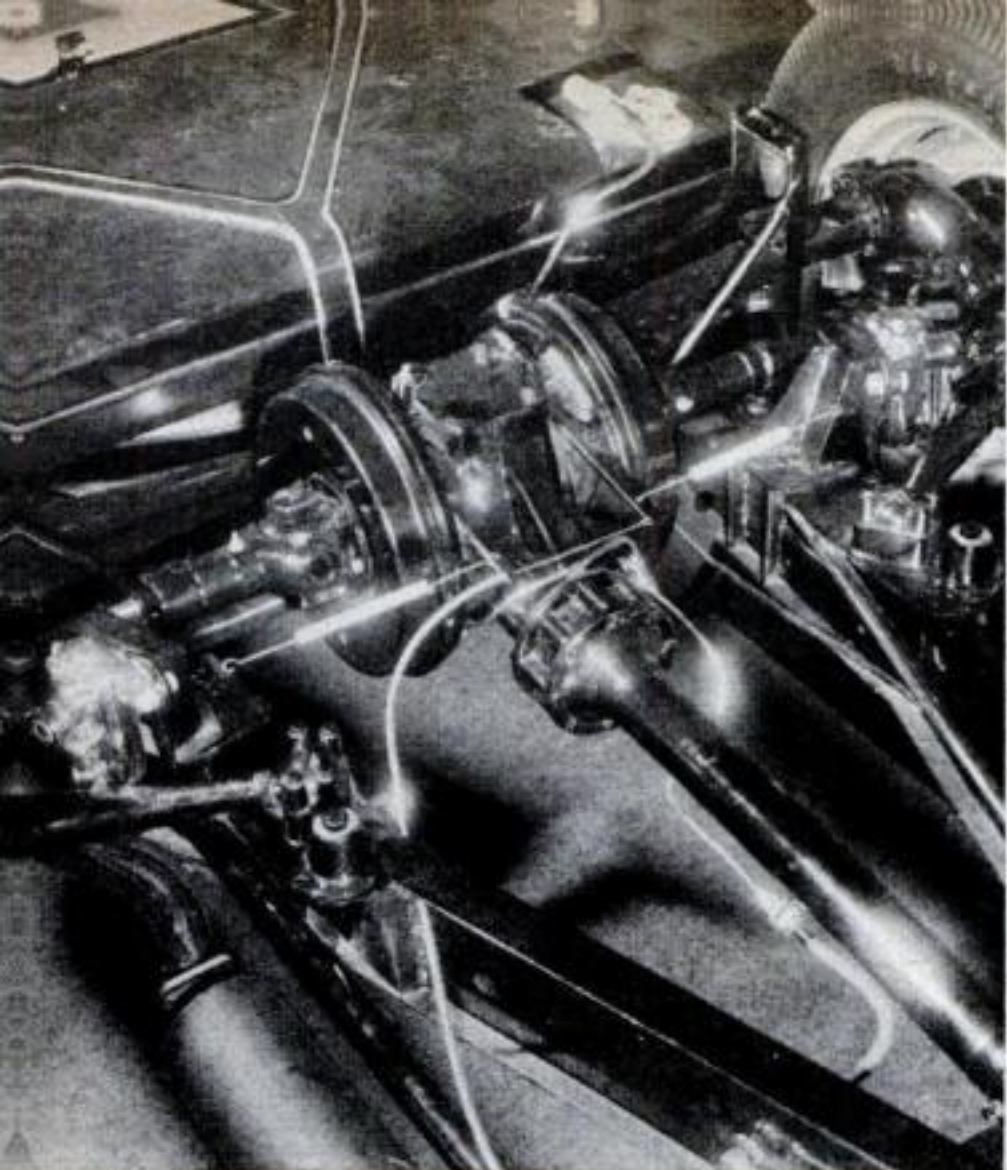
for hood, luggage compartment, spare wheel, and gas-filler door; rubber-backed bumpers; and thermostatically controlled radiator shutters.

Daimler's up-and-down shift with fluid clutch is shown at left below. Hillman Minx, center, shifts directly opposite from Austin, right.

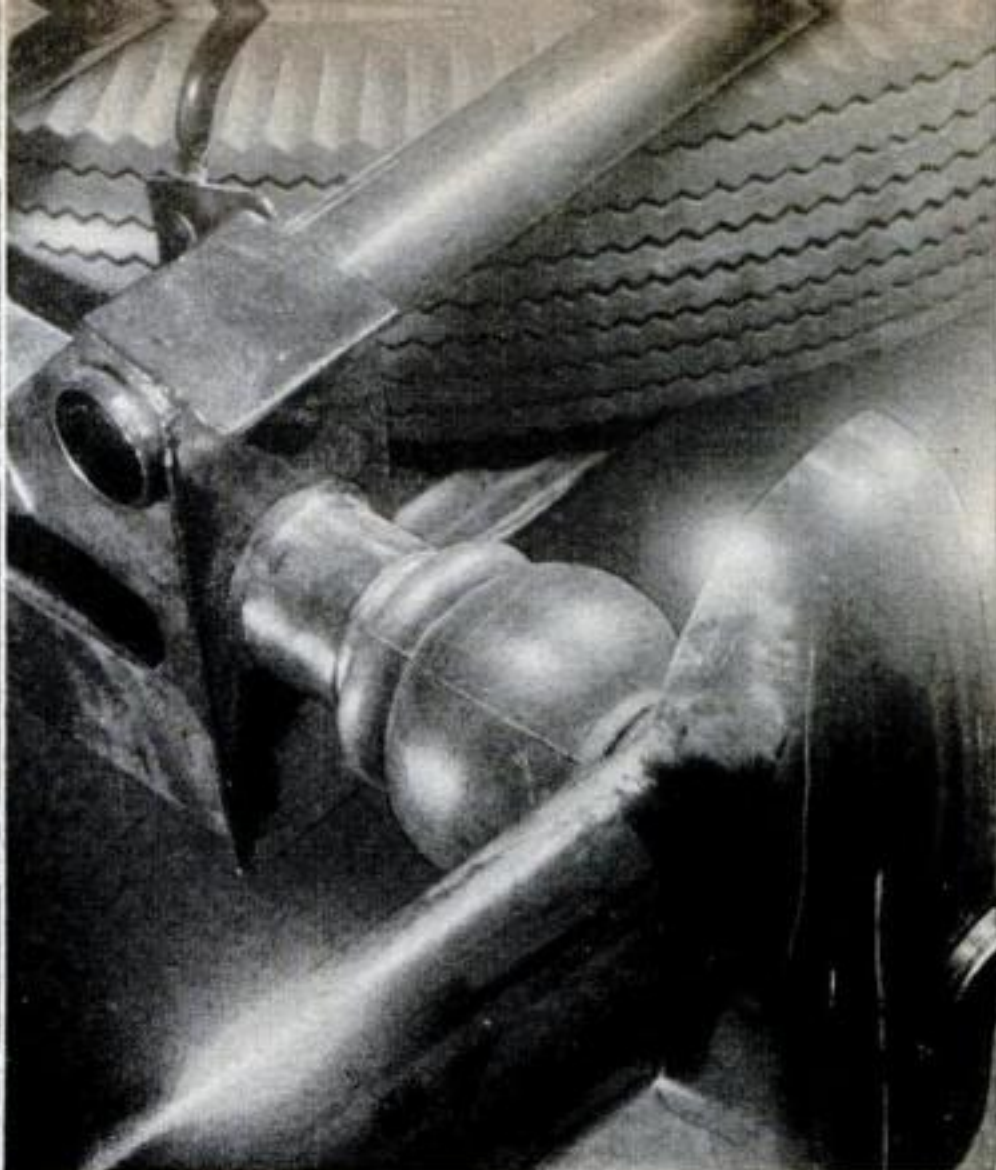


Built-in jacking system on Austin consists of threaded pedestal that is cranked down through outer car frame. Greatest advantage is rigidity of support. British last year produced 630,665 cars, trucks, and buses, of which more than half were exported. Gimmicks like one at right are selling points in U. S. market.

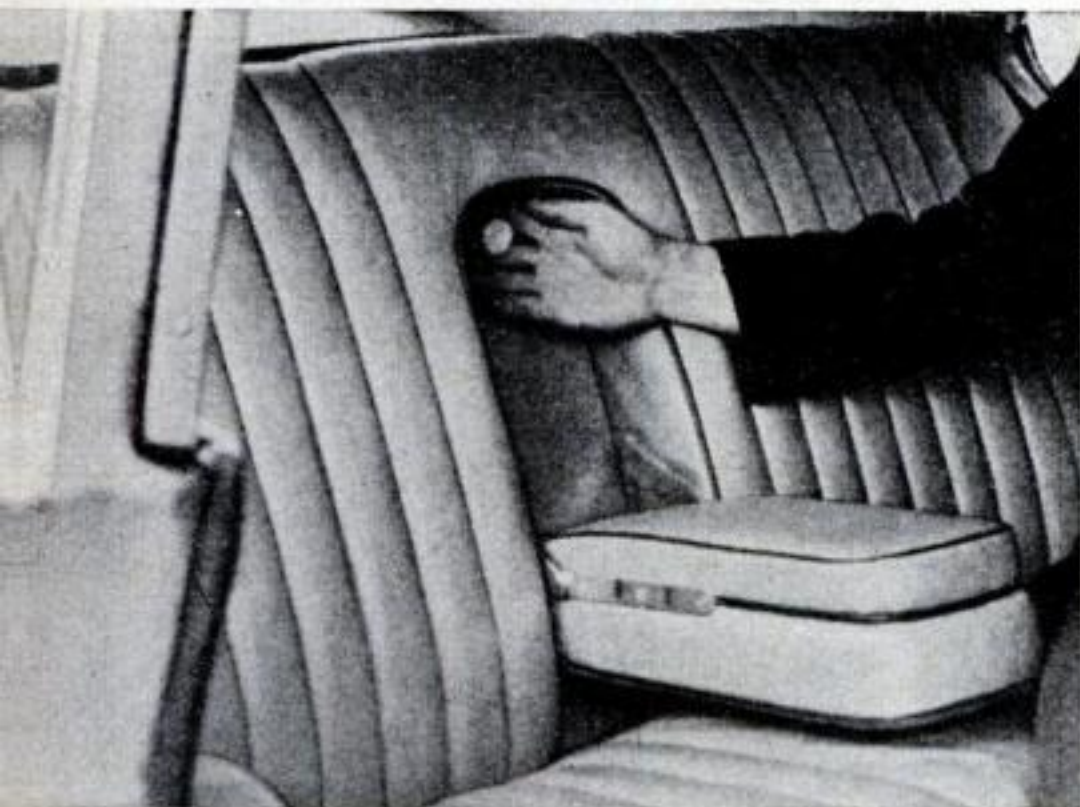




Wheels are mounted on wishbones, with torsion-bar springing. Putting brake drums in-board on chassis lessens the unsprung weight.



Bumpers, made of rolled steel for strength, act against foot-long rubber-core shock absorbers. Convertible delivers in New York for \$6,950.



To open luggage lid, drop folding arm rest in rear seat and pull this control. Body is made of aluminum-alloy sheet on steel framework.

Locating spare wheel in locked compartment with its own door underneath luggage bin is common British practice. Here's Jupiter's spare.



Another hidden button releases locked door over gas-filler cap. Available here only by special import, car sells in England for \$5,400.

This import is pedal-propelled toy with real headlights. Priced at \$149, it was most expensive vehicle per pound in recent British-car show.





Lightplane Leaps Off Ground

THIS new Piper Super Cub can be off the ground in five lengths of its own fuselage and land in as little as 75 feet. Above, it clears a 20-foot obstacle from a standing start 200 feet away. The two-place, 108-hp. plane can climb at better than 1,000 feet a minute and cruise at 105 m.p.h. Designed primarily for crop dusting and spraying, the new Cub can throttle down to 33 m.p.h., and carry its own weight in chemicals.

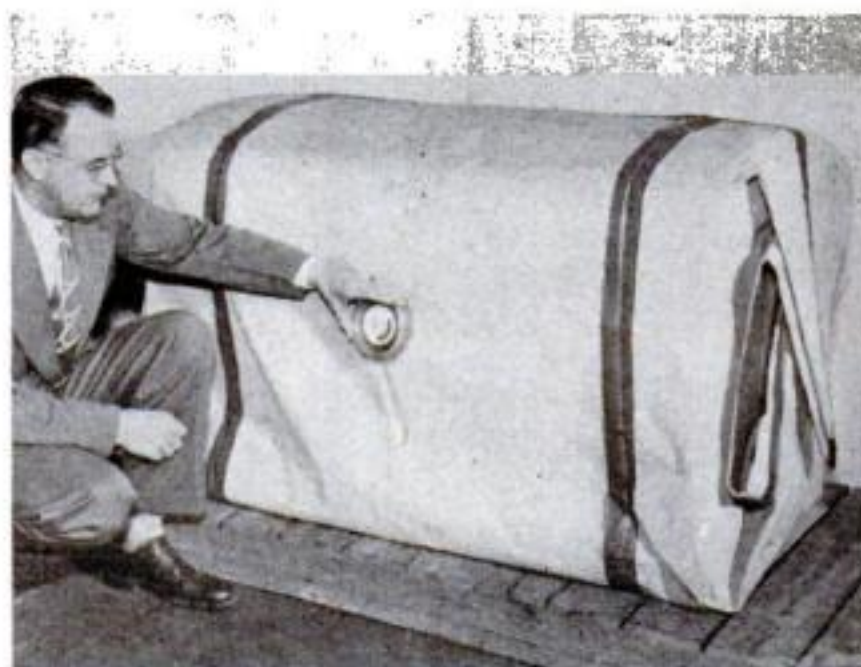


New tandem gear enables plane to land on muddy fields, climb over rough, rocky ground.



New Plastic Outdoes Rubber

THE four middle strips above are samples of a new flexible plastic made in varying degrees of hardness and elasticity to bridge the gap between brittle rubber (strip at far left) and soft rubber (far right). A thermosetting plastic, Enrup is abrasive- and chemical-resistant. Used for gears and other machinery parts, it will outlast metal in many such applications. It was developed by the U.S. Rubber Co.



Porthole Simplifies Storage

ARMY engineers devised this "porthole" to check on humidity and temperature inside packages of "moth-balled" equipment. The plastic window allows warehouse workers to see a thermometer and humidity gauge mounted inside a package without breaking the moistureproof seal. When humidity rises about a critical 20-percent level, the window is unscrewed, and a drying agent is added to prevent corrosion.



Here's that New Ford Transmission

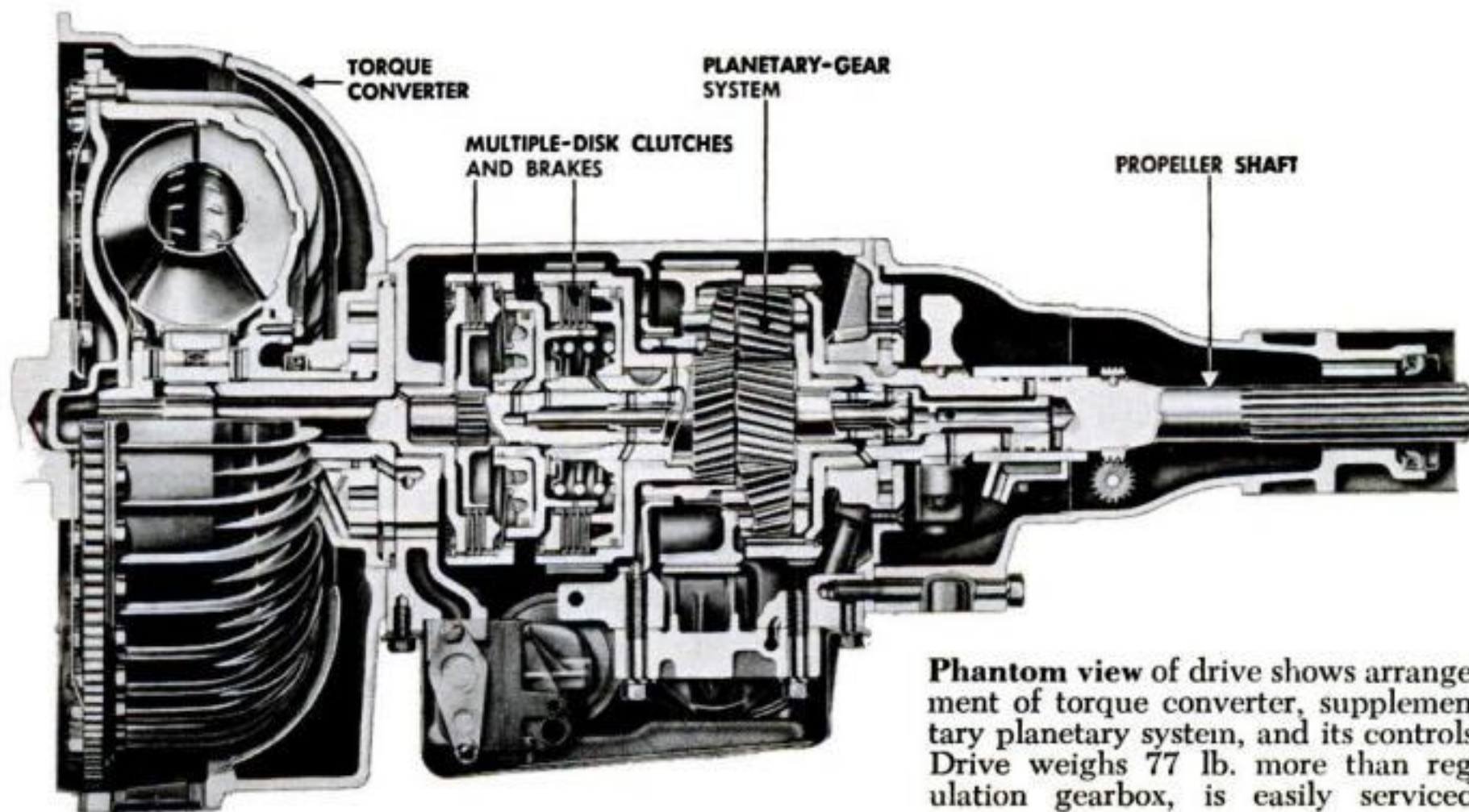
Shift quadrant on new Ford-Mercury drive has unusual selector sequence. To avoid accidental over-travel, lever must be pulled up in going to reverse or low from neutral or drive.

FORD announced that new automatic drive last month. Forecast in POPULAR SCIENCE's review of the new transmissions (April '50, p. 98), it's an optional, extra-cost drive that's also available on the Mercury.

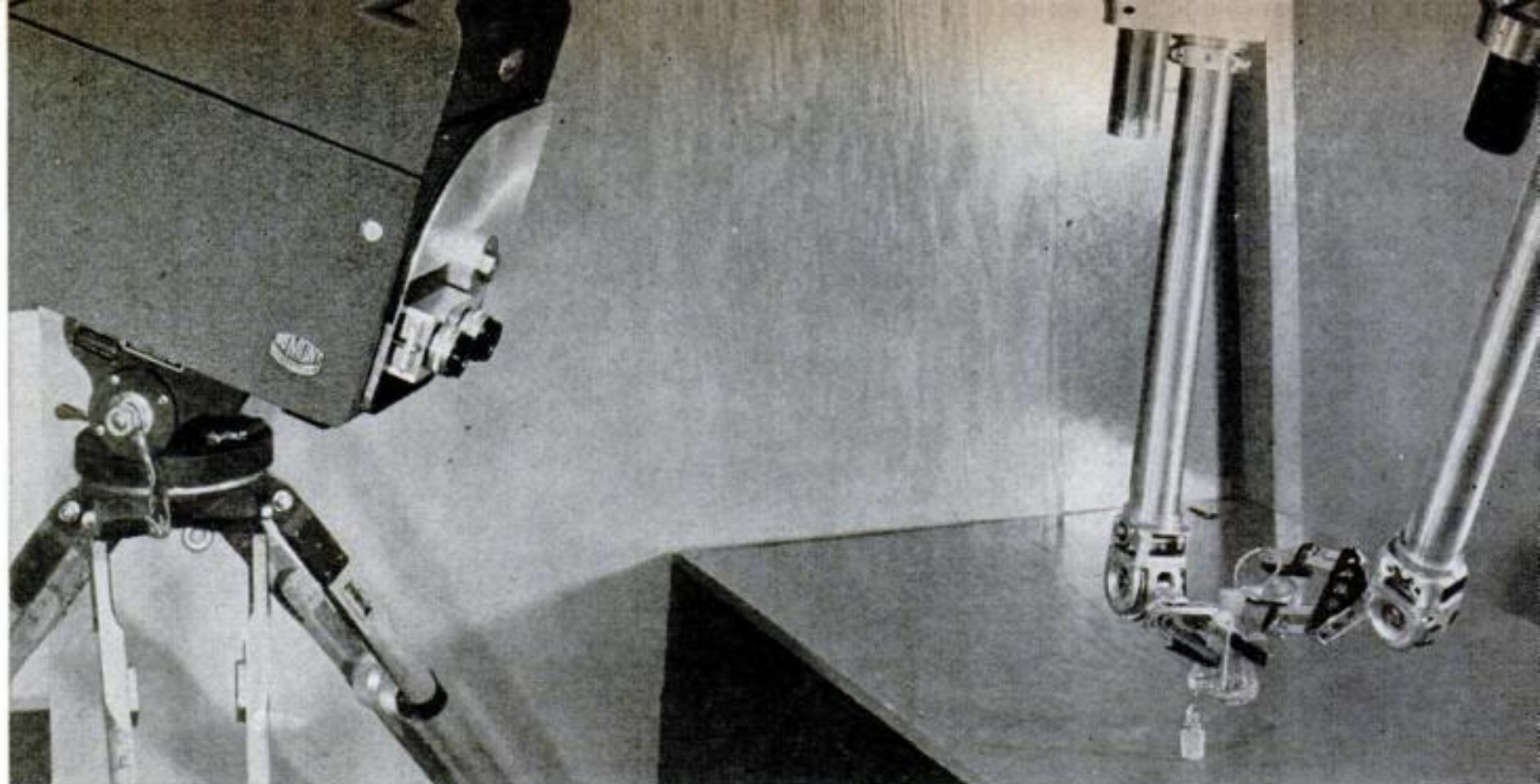
Unlike the drive in a Dynaflo Buick, which is essentially just a torque converter, or in the Chrysler, which has no torque converter, Ford uses a torque converter coupled to an automatic planetary gearbox. In this it resembles Packard and Studebaker. It differs, though, in that the torque converter, which becomes a low-slip fluid

coupling at speed, is *always* in the power train. It has no lock-out feature. Ford engineers say that, by eliminating lock-out, they can use a more efficient converter and rear-axle ratio, and hence save on gas. Frequent shifts between direct and converter drive are eliminated.

The transmission has low, intermediate, high, and reverse gears in its automatic planetary gearbox. With the selector in "Drive," you start up in second plus torque converter. There's down-hill engine braking, and you can rock it in snow or mud.



Phantom view of drive shows arrangement of torque converter, supplementary planetary system, and its controls. Drive weighs 77 lb. more than regulation gearbox, is easily serviced.



Two-eyed TV camera sends stereoscopic view as mechanical hands open radioactive material.

Three-Dimensional TV Gets First Job in Atom Lab

YOU could sit in New York and watch yourself open a can of beer in Chicago with the new television-eyed mechanical hands at Argonne National Laboratories. Actually, Argonne scientists don't get as far off as New York, and they don't open beer cans—they watch their mechanical hands work on deadly radioactive materials.

Three-dimensional television, used here for the first time, lets the scientists see at a distance with all the fully rounded depth caught by human eyes. Mechanical hands let them do at a distance almost anything human hands can do. One type of mechanical hand is electrically controlled, so experiments can be performed at any separation—from another building, or even another city.

But most often, the scientist sits on one side of a thick concrete wall, with the hot stuff, experimental equipment, and stereo TV camera on the other side. He watches the TV screen and works the mechanical hands. The third dimension helps him spot tools and equipment more easily and accurately—it is very difficult, for example, to

pour liquid from one container to another without a perception of depth.

The stereoscopic method is similar to one used in some three-dimensional movies. The television camera has two lenses, set side by side about as far apart as human eyes. The lenses focus slightly different images—one for each eye—on a single TV camera tube.

A standard table-model receiver then shows the two pictures side by side. In front of each picture is a polarizing filter, one polarizing horizontally, the other vertically. The operator wears polarizing spectacles with one lens polarizing horizontally, the other vertically. Thus his left eye can see the "left" picture because the "left" picture filter polarizes the same way as the left eye's lens. His left eye cannot see the "right" picture because its filter polarizes in the other direction, and it therefore appears black. In the same way, the operator's right eye sees the "right" picture but can't see the "left." Prisms on the operator's spectacles shift the two side-by-side pictures so that they fuse into one three-dimensional image.



Two images on screen—one from each lens—are fused into single stereoscopic picture by opera-

tor's spectacles. This viewing setup could be used for entertainment TV in three dimensions.

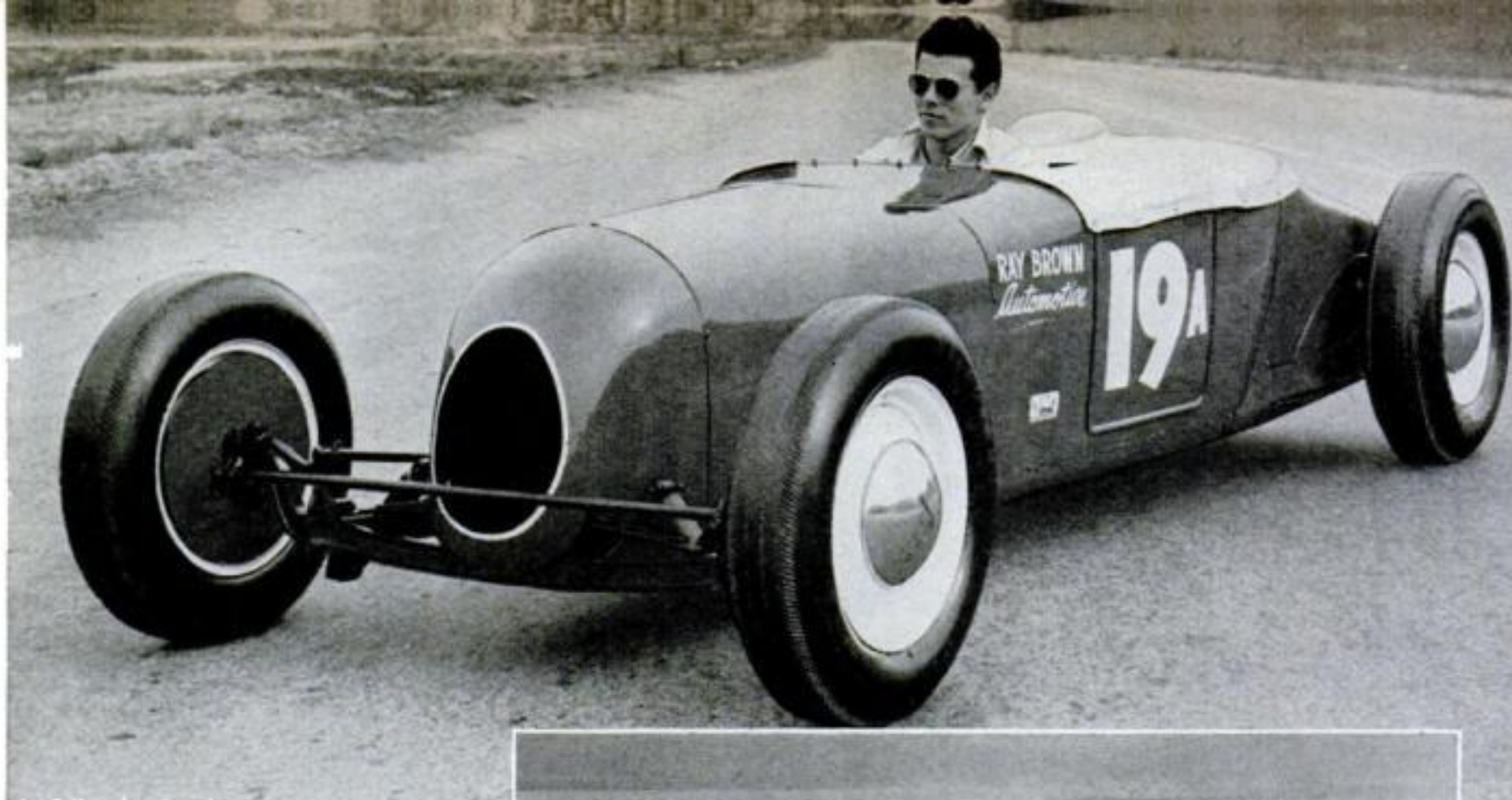
A different viewing set-up has two receivers, one for the "right" image and one for the "left." They are mounted at right angles to each other, with a polarizing filter over each screen, and with a semitransparent mirror at a 45° angle between the two sets. The mirror both reflects and transmits light, so that the two pictures overlap. This eliminates the need for the prisms (but not for polarizing spectacles), and makes it easier for several people to watch at once.

Can TV entertainment broadcasts be given a third dimension the same way? Yes, say engineers of Allen B. DuMont Laboratories, which supplied Argonne's video equipment. It would require no important changes in present transmitters or receivers—just twin lenses on the cameras, filters on the viewing screens, and the special polarizing-prism spectacles for the audience. Picture detail, however, would be reduced. DuMont has no plans for stereo telecasts now, but both it and Argonne point out that the system might find many industrial and military uses aside from handling hot atoms.

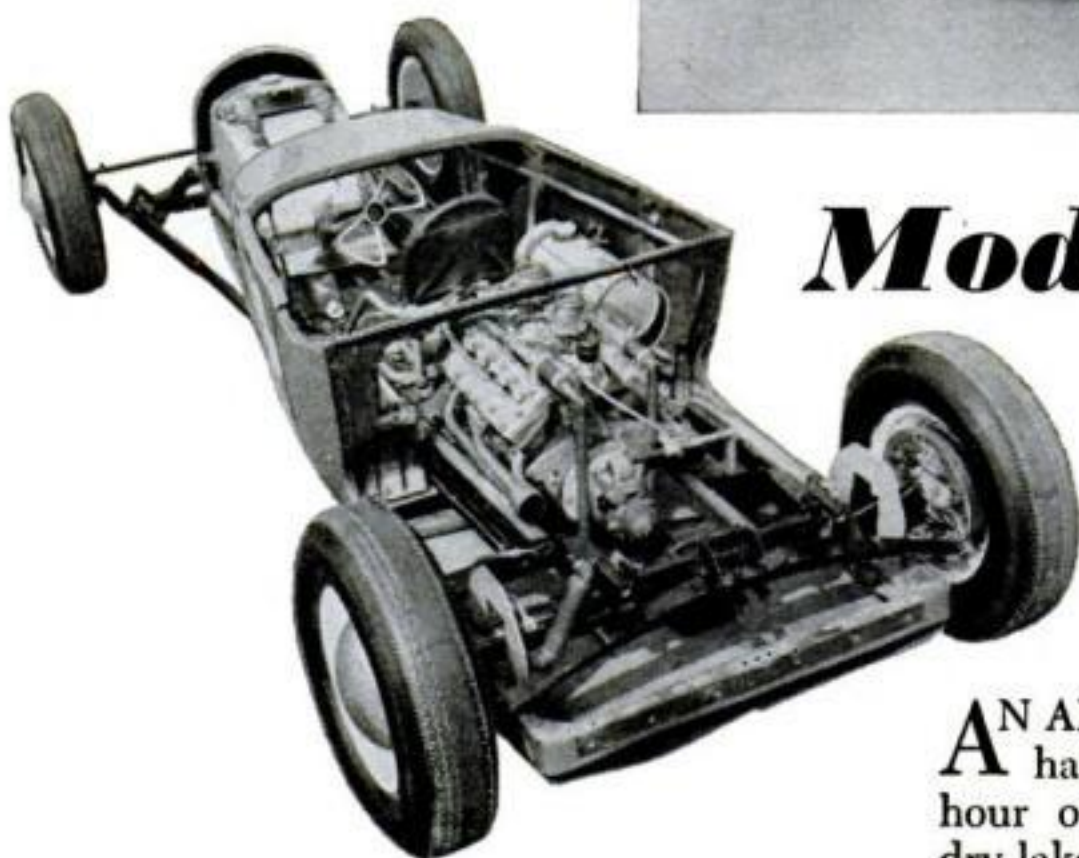
END



Different three-dimensional viewer uses two receivers and semitransparent mirror to make pictures overlap. It simplifies viewing spectacles, permits more people to watch at once.



Builder of this hot rod, above, hits it up, right. Dog clutch couples rear engine, below, to rear end by short drive shaft, eliminating the transmission.

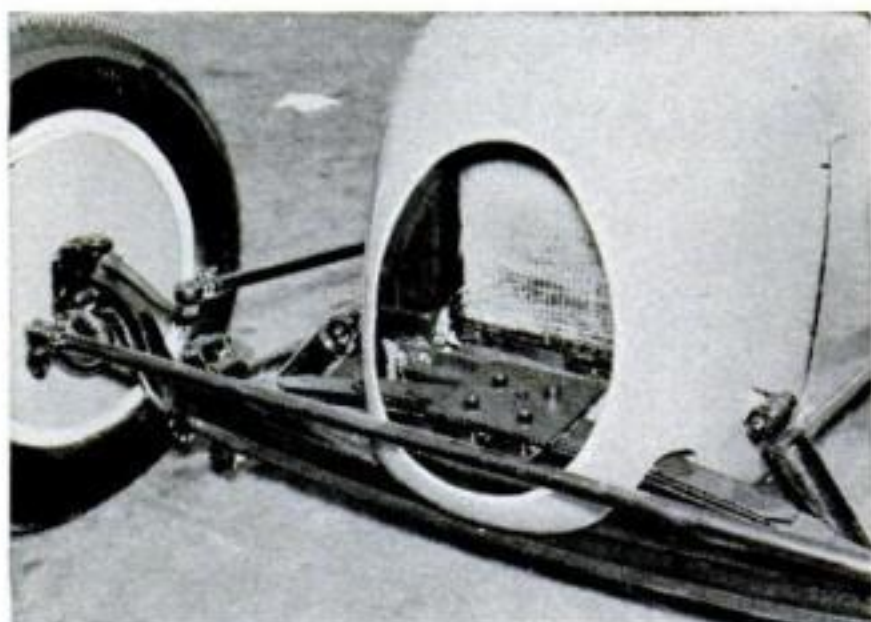


Model T Comes to Life as Hot Rod

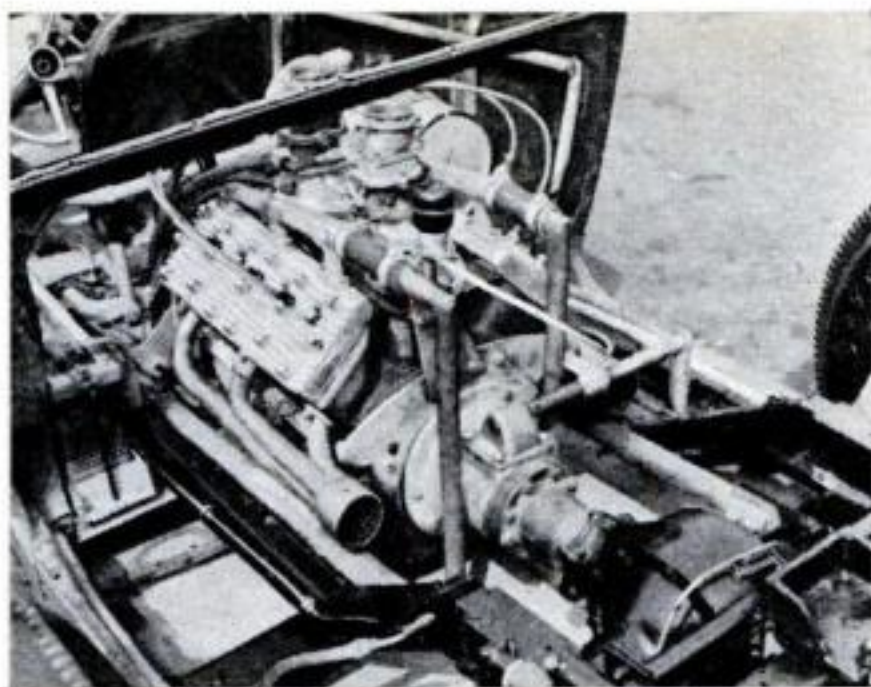
AN ANCIENT chassis in streamlined dress has been clocked at 134.73 miles an hour on Southern California's El Mirage dry lake. The power in this hot rod, built by Ray Brown of Los Angeles, is moderate—a 60 hp. Ford V-8 engine that is 12 years old. The chassis, lifted from a 23-year-old Model T, got a thorough reworking.

The hot-rod fraternity, to whom speed is a fetish, consider the Brown homemade roadster one of the most original designs yet to sizzle across the alkali. Chief among its innovations is an engine mounted in the rear and cooled by a front-mounted radiator.

Model-T rails form the frame. Tubing replaces both the front and rear crossmembers, strengthening and lowering the chassis. The tie rod crosses in front of the oval air intake in the nose. A Franklin ball-bearing steering unit has been converted to a center-mounted



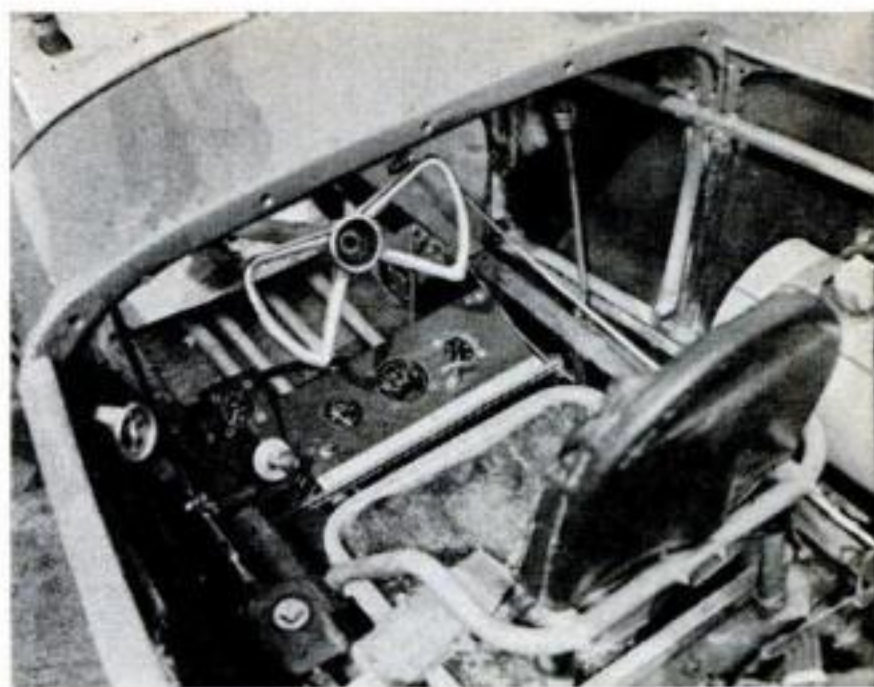
Air scoop cools engine. Four thin-wall aluminum tubes route water between radiator and engine. Engine jacket has four water intakes.



Engine is bored .1 in. oversize to 2.7 in. and stroke lengthened .2 in. to 3.4 in. Pistons are aluminum. Compression ratio is 8.75-to-1.

inverted type. Brakes, on the rear wheels only, are late-model Ford hydraulics.

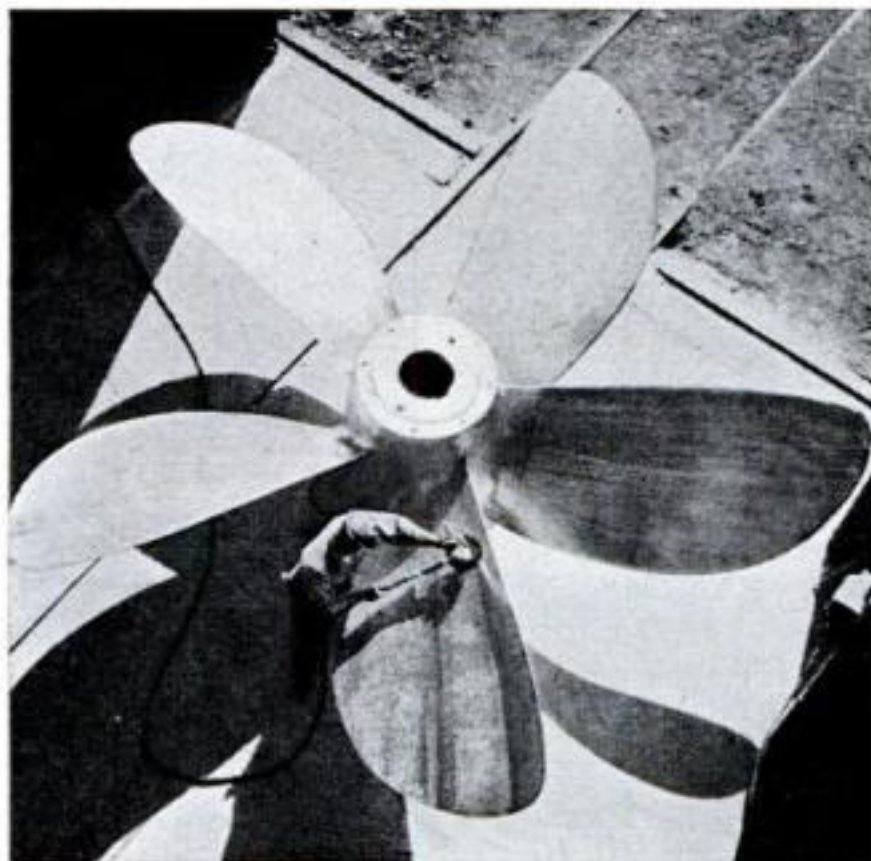
For speed runs, an aluminum shroud seals the engine off from the cockpit. A



Controls are foot accelerator, hand brake on left, hand clutch on right. Rear-end gear ratio is 3.78-to-1. Highest engine r.p.m. is 6,800.

canvas tarpaulin is stretched taut over the cockpit to reduce air turbulence at high speed. The car weighs 1,500 pounds. It is painted a blazing red and white.

Tanker Prop Has Five Blades



WHEN a conventional propeller set up severe vibrations in a big new tanker, the *S.S. R. G. Follis*, designers came up with the petal-like screw pictured above. Weighing 18 tons, the manganese-bronze casting is 18 feet in diameter. A 5,000-hp. steam turbine provides the power to spin it. Ship-builders term the five-bladed propeller a revolutionary development for large single-screw vessels; previous installations have been on the wing shafts of quadruple-screw, high-performance naval craft. With its new prop, the *Follis* has no critical vibration, and goes faster at a lower shaft speed.

B-36 Pods Hold Spare Engines



THESE metal growths under the wings of a B-36 fuselage are nacelles hung from the bomb bays for carrying spare engines to bases where they are needed. The bomber's builder, Consolidated Vultee, says each of the two pods will accommodate two nacelles and engines, totaling four big radial engines between them. The containers are attached to streamlined beams suspended from the bomb racks in the forward section of a bomb bay. Each is 32 feet long and about eight feet in diameter at its widest point. Combined weight of the two containers, with spare engines loaded, is 25,000 pounds.



Auto shower consists of 17½-foot plastic hose fitted with 7 tiny brass nozzles. Kit also includes 7 clips that hold hose to door frame and bottle of special detergent shampoo that is good for about 5 washings.

New Auto Shower Sprays Car Clean

YOU can now wash your car in your own garage just the way big auto laundries do. This home auto shower is simply a plastic hose, fitted with tiny nozzles, that fastens to the door frame of a garage. In action, it sprays a car from all sides at once. The car is first sudsed with a detergent, then driven slowly back and forth through the spray to rinse it clean. Time: 15 min. to install, six to wash. Maitland Products, Port Washington, N. Y., sells the kit for \$6.95.



Metal clips, screwed to door frame, hold hose to sides and top of garage. Nozzles point slightly outward to prevent spraying into garage.



Soft brush or rag is used to suds all surfaces of the car with a special detergent, mixed one teaspoonful to a pail of hard or soft water.



Experimental model above, attached to garden hose, shows how sprayer works. Unit on

the market has seven nozzles that cover top and sides of car. Maker says it doesn't waste water.



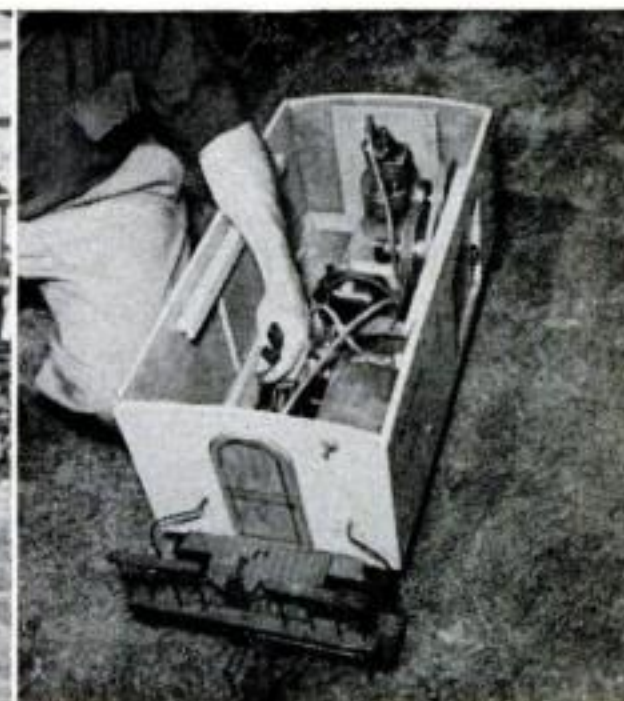
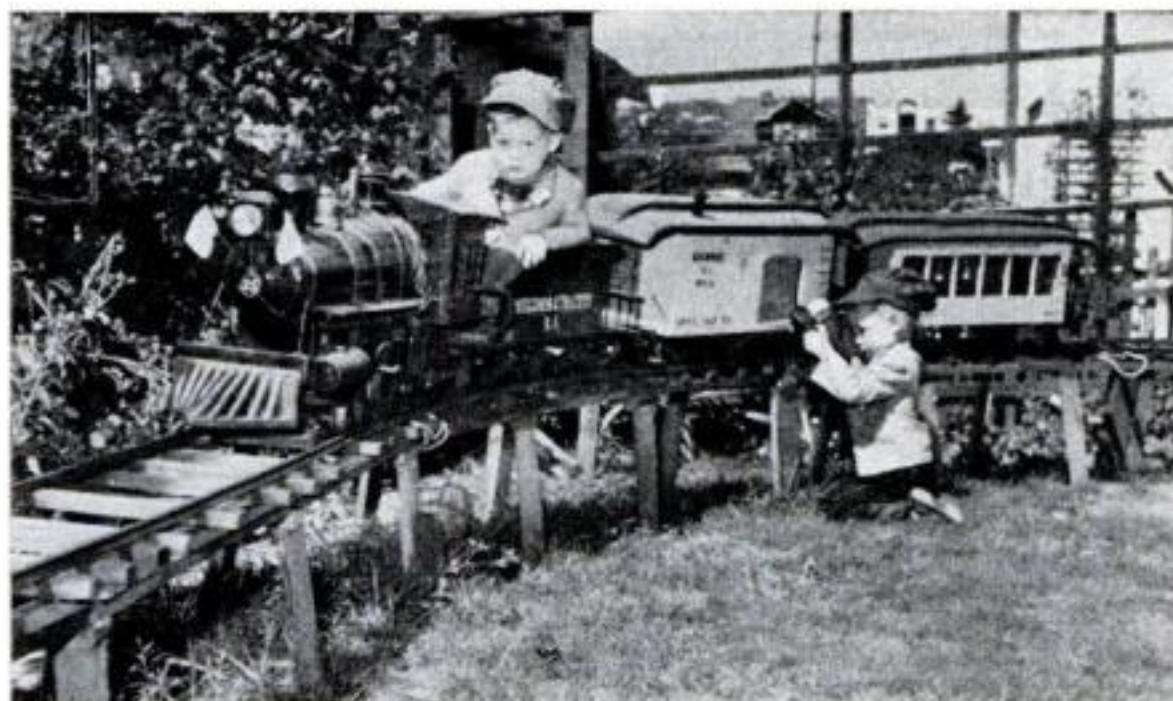
Speedboat "Flies" Like Plane

THIS hydrofoil speedboat can do everything an airplane can do but fly—and it can almost do that. Three underwater fins, shaped like airfoils, enable it to climb right out of the water, riding on the fins instead of the hull. The fins, which can be tilted

up or down, are controlled by an airplane-type stick. Moving the stick forward or back operates the bow fin, causing the boat to climb or dive. Sideways motion controls the stern fins, making the boat bank to either side. Pedals operate the outboard motor as a rudder. The novel boat was built by Allyn Hazard, of Albuquerque, N. M.

Truck Doors Roll Open

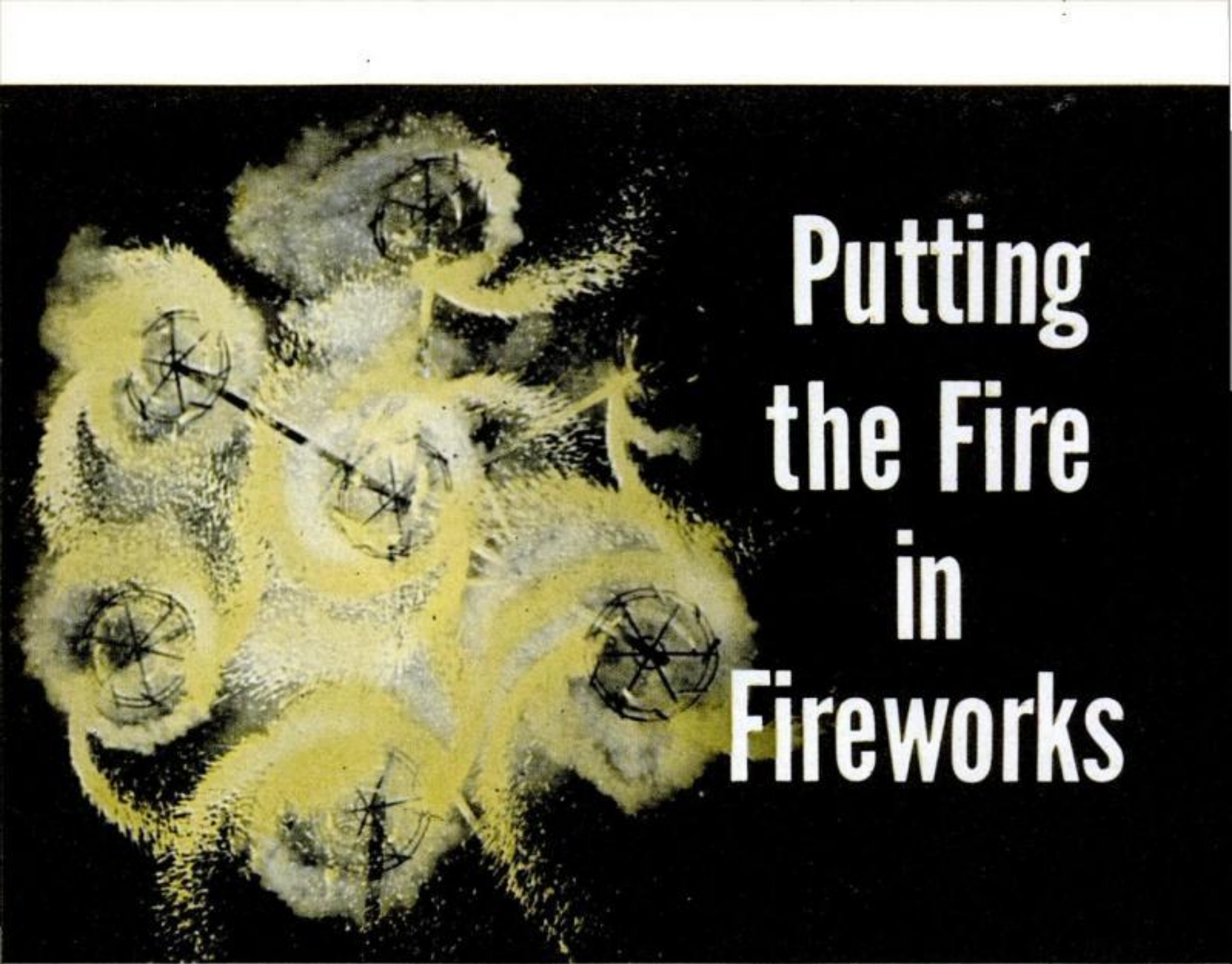
THE British-made doors on the truck at right work like an old-fashioned roll-top desk. Made of narrow aluminum slats hinged together, the flexible doors roll along tracks on small wheels. The tracks curve inward at each corner of the truck's rear, carrying the doors back into the walls. Developed by Normand, Ltd., of London, the new doors are said to give truckers greater freedom of movement while eliminating the hazards of ordinary doors that often stick out into the street or sidewalk when open.



Model Railroad Hauls Kids

JUNIOR trainmen Paul and Barney Simonson ride this authentic reproduction of a historic Virginia and Truckee train around a 150-foot track in their Oakland, Calif., back yard. It was built by their grandfather, home-movie hobbyist Ray Maker (PS, June

'50, p. 156). Two small electric motors, one in the 40-inch-long locomotive and the other in the mail car (right above), give it a top speed of 7 m.p.h. Another motor, in the mail car, drives a compressor to blow the whistle. A fourth motor, in the engine, operates a bellows to puff out smoke made by burning a mixture of oily waste and tar.



Putting the Fire in Fireworks

Revolving colored-fire displays like this one gradually are replacing firecrackers on July 4.

A salute to the men and machines that work all year to give you a bang-up Fourth of July

By Devon Francis

PS photos by Hubert Lockett

IT WON'T mean a thing to the small fry, but the Fourth of July is getting a little saner. It may even be safer.

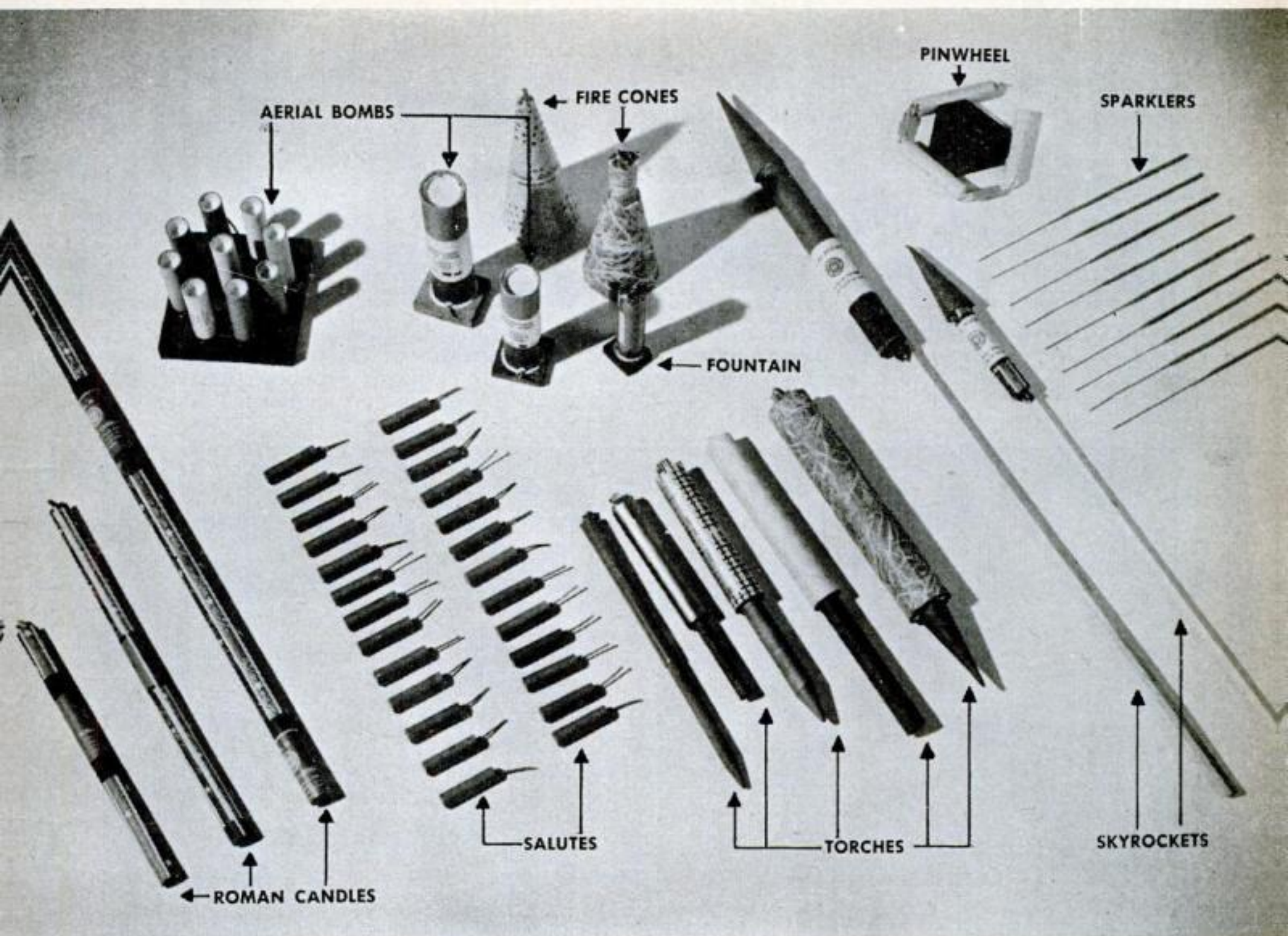
The new generation of youngsters is in no position to remember, but their fathers hark back to the days a quarter of a century ago when a kid could set off one of those big, yellow cannon crackers without bringing the cops. Today firecrackers are illegal in 32 of the 48 states. The law has cracked down.

I motored to Cranbury, N. J., last month to find out what, if anything, had happened to the Fourth of July industry in the last 20 or 30 years. Bill Hayward told me. He runs the world's biggest pyrotechnic factory, owned by the Unexcelled Chemical Corp.

Like all plants dealing with explosives, it is set off on an isolated parcel of land surrounded by a high wire fence. Its 600 acres is a forest of small buildings, some of them only big enough to hold one workman. There's a reason for that—if one building blows up, it won't set off the others.

Bill said the same things that were popular away back when are still the best sellers today—Roman candles, rockets, sparklers, and a 2-inch firecracker called a salute. But something new has been added. A whole new line of safe-and-sane fireworks gradually is gaining favor with the public. These consist of gimmicks that you stick in the ground and light to produce fountains of fire. They're pretty, but give me the cannon cracker that scared the pants off a motorist when you tossed it under his car.

July Fourth may be saner but I'm not so sure it's safer. At least it's not *absolutely* foolproof. I burned my hand with one of the items in the accompanying photo layout.

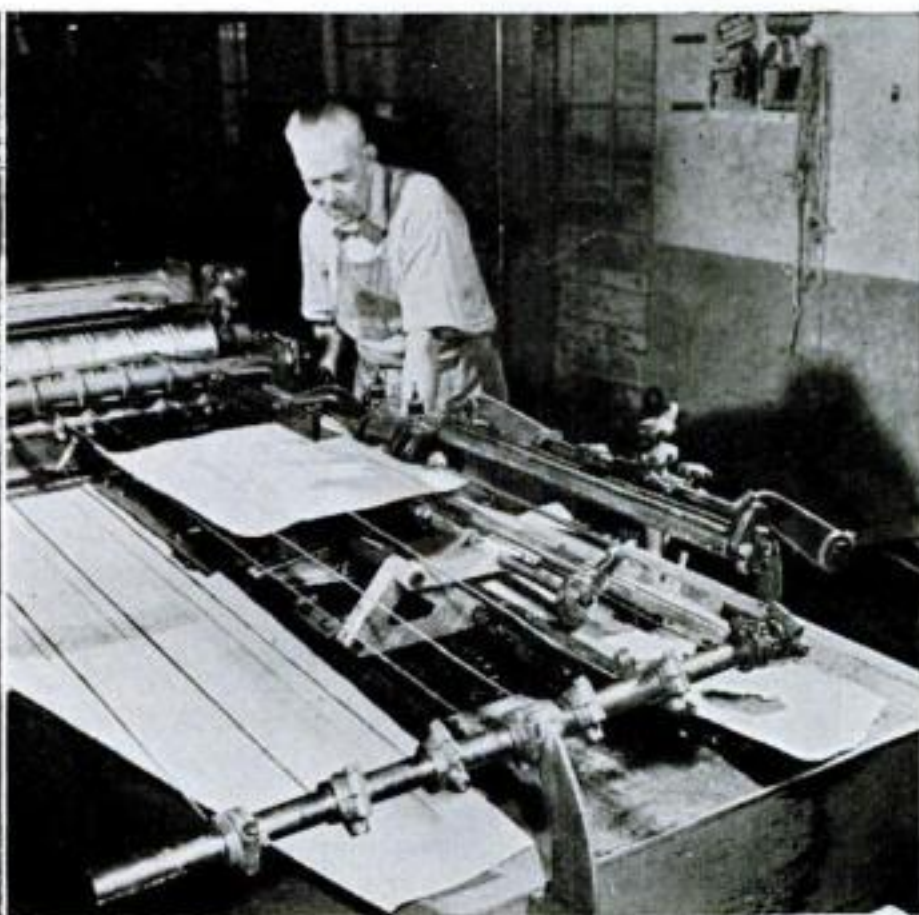


In most states today's fireworks are designed for eye appeal. The world's biggest factory makes

100,000,000 salutes a year, 35,000,000 sparklers, and upward of 3,500,000 Roman candles.



Rolling and pasting paper tubes and cones is first step in manufacture. Here Roman-candle tubes are rolled by hand-fed machine. Thickness of walls depends on the explosive used.



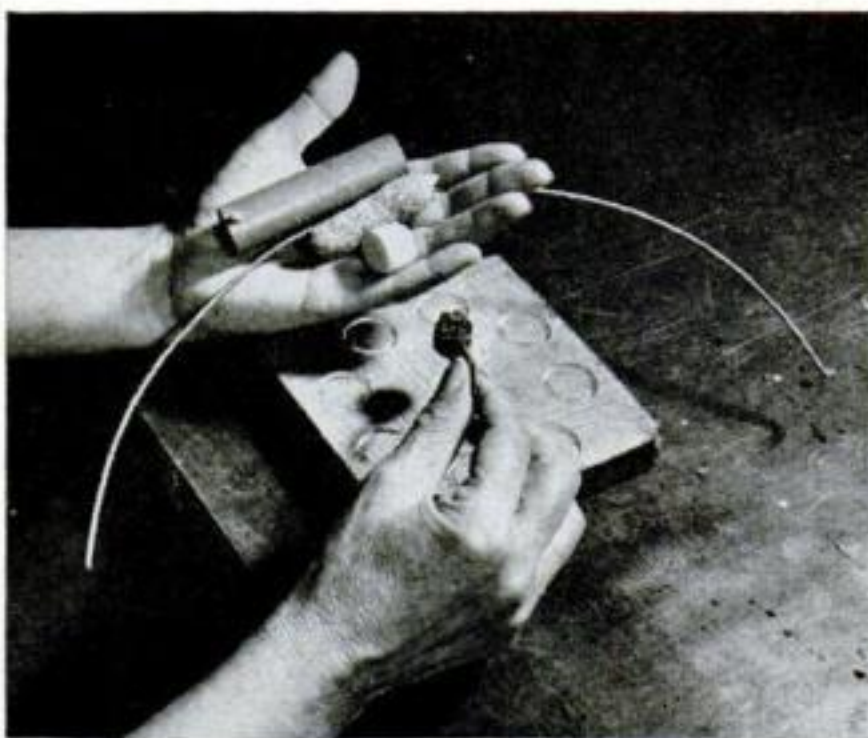
This machine does same job automatically. Other steps in process are mixing chemicals, loading, ramming, assembly, pasting on decorative paper, packing. *[Continued on next page.]*



Automatic rotary plate machine feeds in firecracker tubes, crimps bottoms to seal, puts in about 10 grains of powder, fuses, crimps tops, and expels finished product for packing.



Multicavity mold forms Roman-candle pellets. Burning element is potassium perchlorate. Red fire comes from strontium nitrate; green, from Paris green and barium, potassium chlorates.



Into final assembly of 9-shot aerial bomb go tube, fuse, powder, and cup-shaped paper seal. Fuse, circling indentations on wood base where tubes are glued on, sets off bombs one by one.

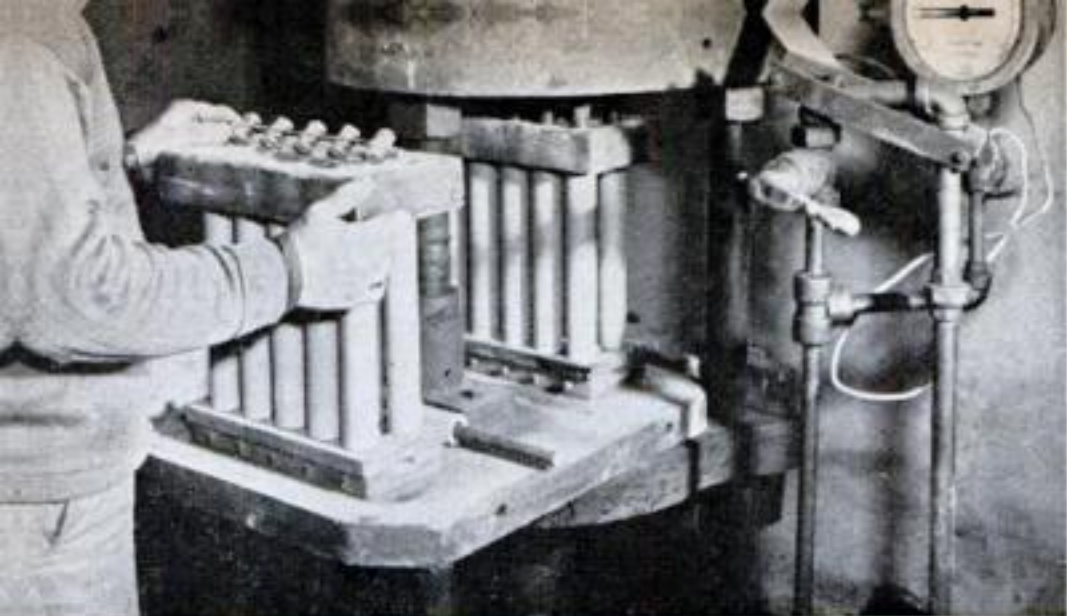


To get a bigger bang out of bomb, powder in 2-inch salute is confined more tightly by dipping 'cracker' in silica gel and rolling it in sawdust. Drum in background does this coating.

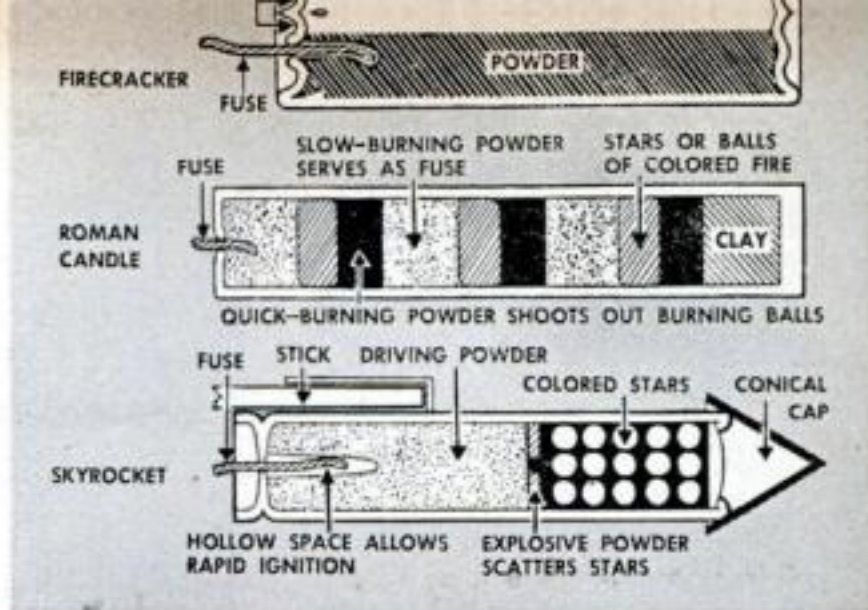


Like most fireworks making, final assembly of aerial bombs is by hand. Rate of burning in explosives is controlled by secret formulas. This

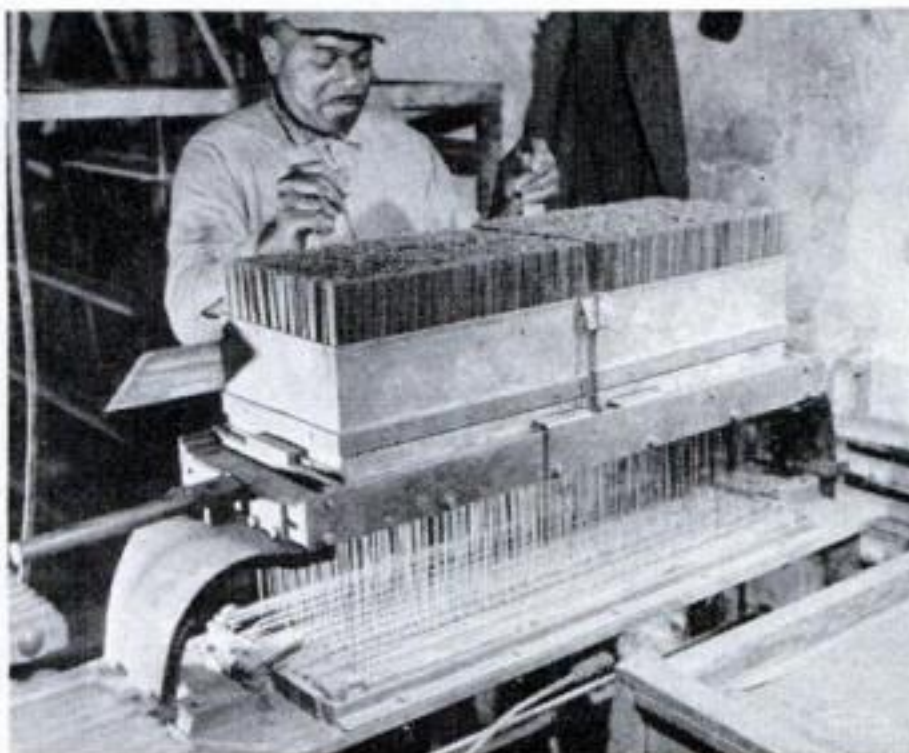
factory, with 350 workers, 125 buildings, made munitions during war and now is also engaged on certain defense projects for government.



This hydraulic ram compresses powder in sky-rocket tubes for better propulsive effect. Indicating strength of tubes, dial at right shows pressure of 10 tons per square inch.



Construction of standard fireworks items has not changed with passing years. Drawings above are identical with some used to illustrate a *POPULAR SCIENCE MONTHLY* article in 1930.



Sparkler making starts with lengths of soft wire. Wires are shaken through perforated box into dipping frame and locked in. Wire gauges start at 18, differ with length of sparkler.



Sparklers are dipped, dried, dipped again. Solution consists of aluminum powder and barium nitrate as burning elements, iron filings to produce sparkle, and dextrine as a mucilage.

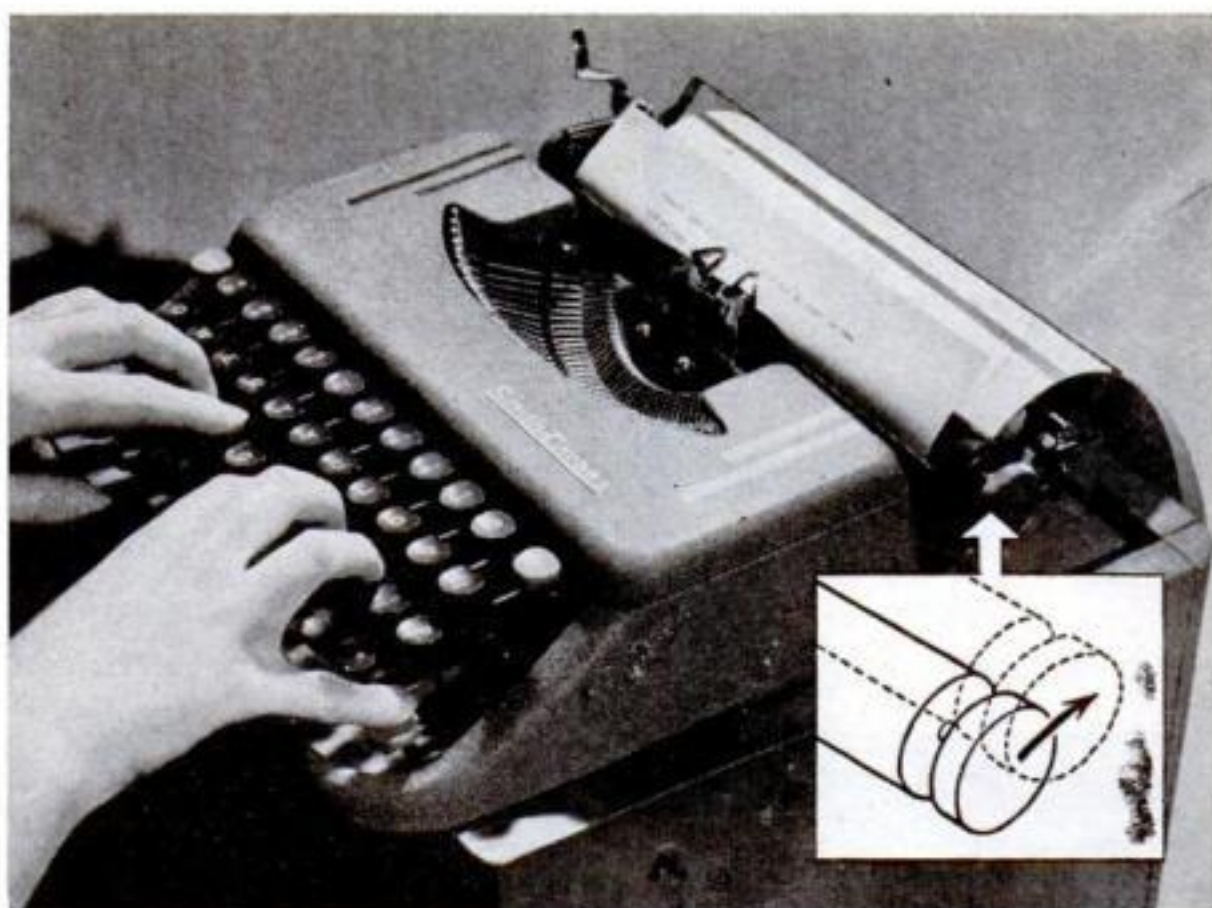


Final step in fireworks factory, as in any other manufacturing process, is packaging. Here sparklers are being put in boxes for shelves of

retail stores. One worker packs 35,000 a day. Fireworks sell best in northern states for July 4th, but in South it's for Christmas.

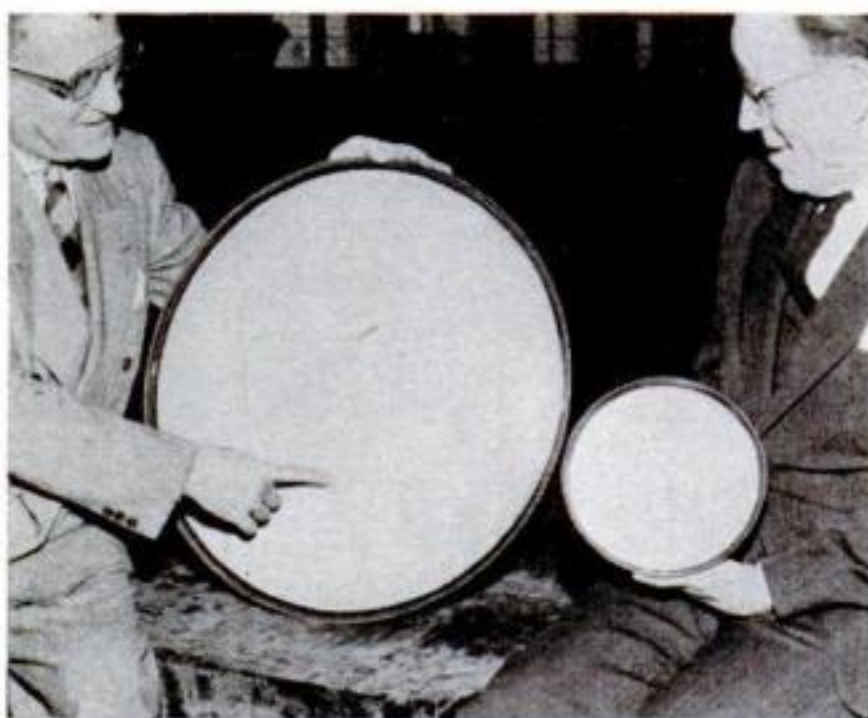
Portable Machine Has Fewer Parts

THIS new nine-pound portable typewriter is small enough to fit in your desk drawer, say the makers, L. C. Smith & Corona Typewriters, Inc. Fewer parts are required by the Skyriter, thanks to its type-shifting mechanism that rocks the carriage backwards, as shown in the inset at right, instead of depressing the type basket—the method used in some conventional machines to shift to capitals.



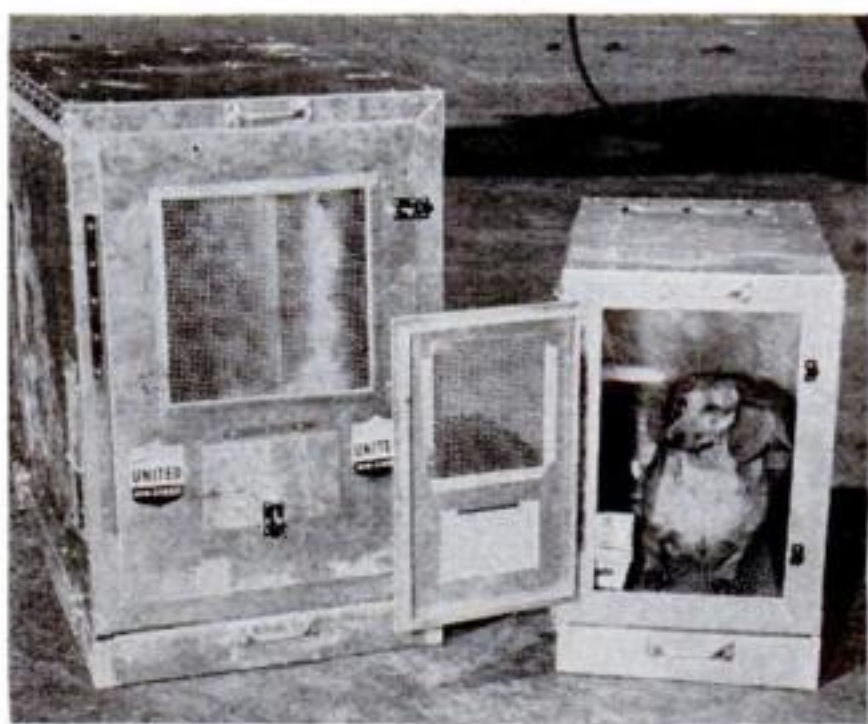
Gadget Aids Golfers

SHAPED like an enlarged key and carried on a key chain, the gadget at left does 12 different jobs for golfers. It has a sharp edge for roughing-up a club's grip or digging dirt out of its furrow markings. It even provides a wrench for tightening shoe spikes. Numerals on the side of the device indicate average distances for various iron shots. Parpal Co., of Toledo, O. sells the gadget for about \$1.



TV Tube Big As Newspaper

GENERAL Electric this fall will begin producing a television viewing tube almost as big as a standard newspaper page. It will be made only in limited quantities at first. In the picture above the new tube is being compared with one 8½ inches in diameter. The new tube provides better detail and brightness and operates at lower voltages.

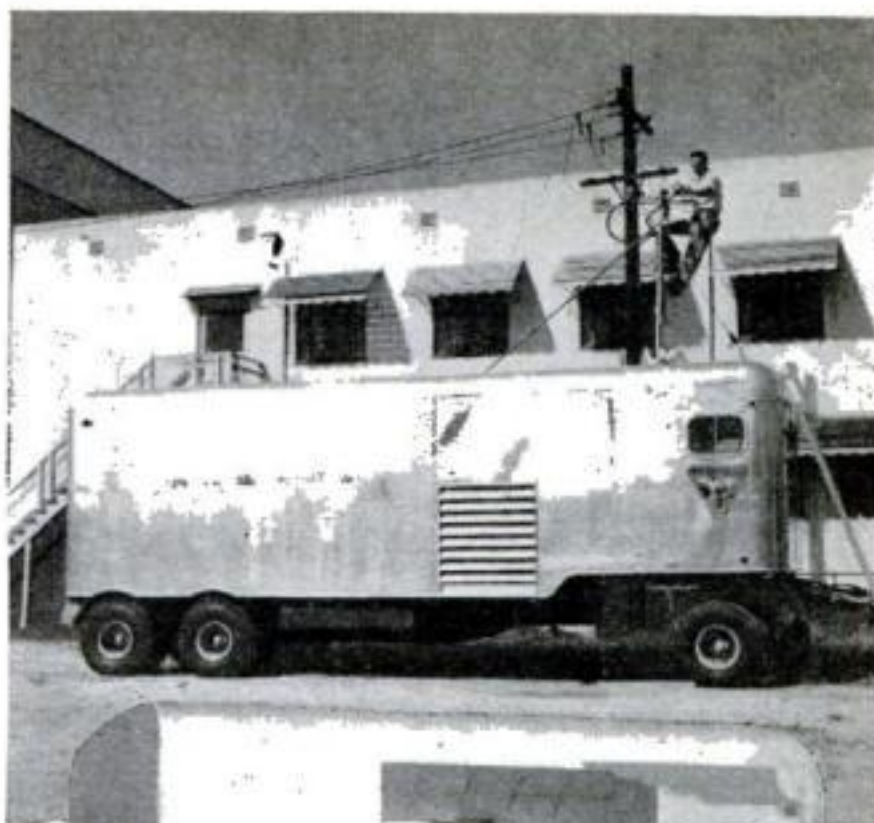
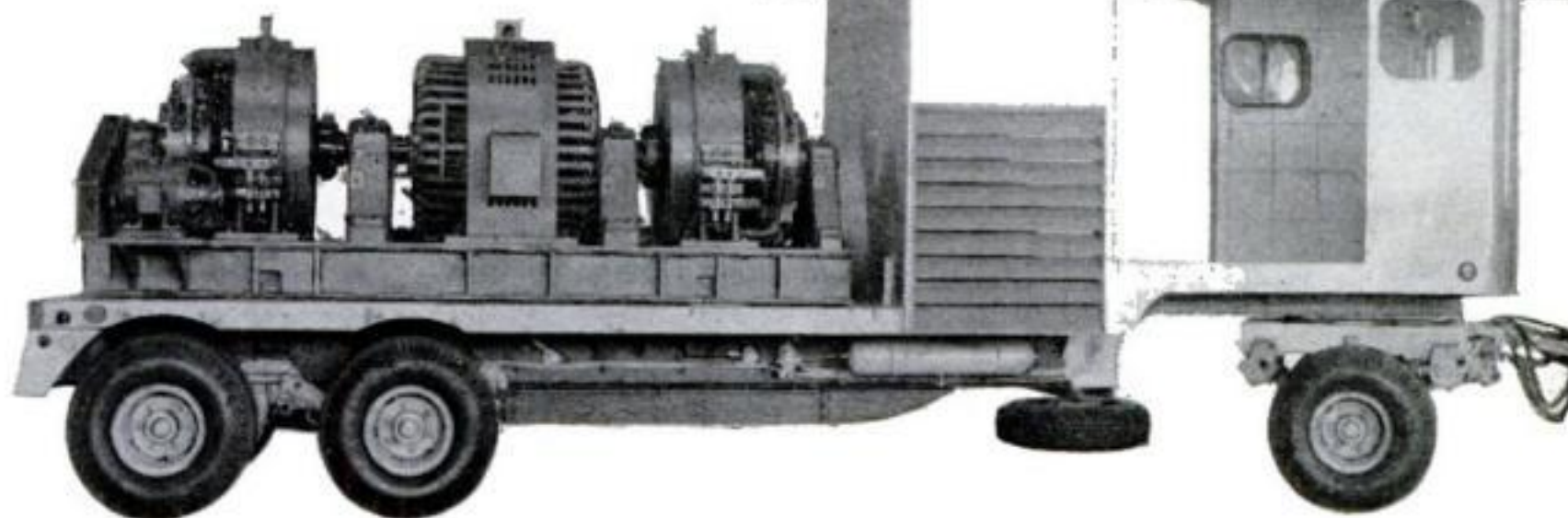


Dog House Made for Planes

A NEW kind of dog house—called a "flight kennel" by its originator, United Air Lines—is being put into service coast-to-coast so dogs can fly with their masters. Heretofore, many of the airlines have restricted dog shipments to all-cargo planes. Built of lightweight metal, the kennels are carried in a plane's cargo compartment.

Power Towed to Movie Set

TOWED to any studio or location, a new mobile power plant turns alternating into direct current for the big arc lights of color-movie sets. A retractable six-foot tower atop the 12-foot-high, 24-ton trailer, which was designed by engineers of Walt Disney Productions, aids in tapping high power lines, as at right. In the view below, part of the all-aluminum body has been removed to show the Westinghouse-built motor-generator set. A single AC motor at the center, connected to the power line tapped, drives a pair of DC generators delivering 300 kilowatts. Special insulation prevents interference with sound camera.



Tiny Detector Tracks Cancer

SO SMALL that a patient can swallow it, the miniature Geiger counter below may help to detect cancer of the stomach. It was developed by Drs. Seymour Gray and Charles Robinson, members of a Harvard University research group. Several times as much radioactive phosphorus, they have discovered, is taken up by stomach cancer tissues as by normal tissue. So they propose administering it and tracing it with the Geiger counter to detect and locate a cancer.



New Jets Race "Upstairs"

NEW afterburners are enabling the F-89 interceptors of the U. S. Air Force to really get upstairs in a hurry. "Sensational" is the phrase used to describe their climbing. The afterburners are enlarged pipes, seen below, behind the turbojet engines. They inject raw fuel into the exhaust stream, and its burning boosts the original 4,000-lb. thrust of each engine by more than half again. The Air Force has revealed that the planes operate in the 600 m.p.h. range.





Restoring historic Williamsburg to its Colonial charm and beauty called for handmade bricks—and the rediscovery of a lost craft.

Solved: Early-American Brick

By Walter E. Burton

DRIVING along a short, deep-rutted stretch of one-way dirt road leading from a pavement near the outskirts of Williamsburg, Virginia, you come suddenly upon a scene that would have been familiar to a Washington or a Jefferson or to any other pre-Revolutionary citizen of the bit of Colonial England that was to become the U.S.A.

For there you see men making brick by the same methods and with the same kinds of equipment and materials used by Colonial brickmakers. You watch a seemingly unhurried manufacturing enterprise whose greatest production difficulty is to keep from making "modern" brick.

Bricks became a big problem when the restoration of Williamsburg to its Colonial-days appearance was first undertaken in 1926.

The restoration plans, launched with financial aid provided by John D. Rockefeller, Jr., called for the duplication of materials, shapes, colors, and appearances that

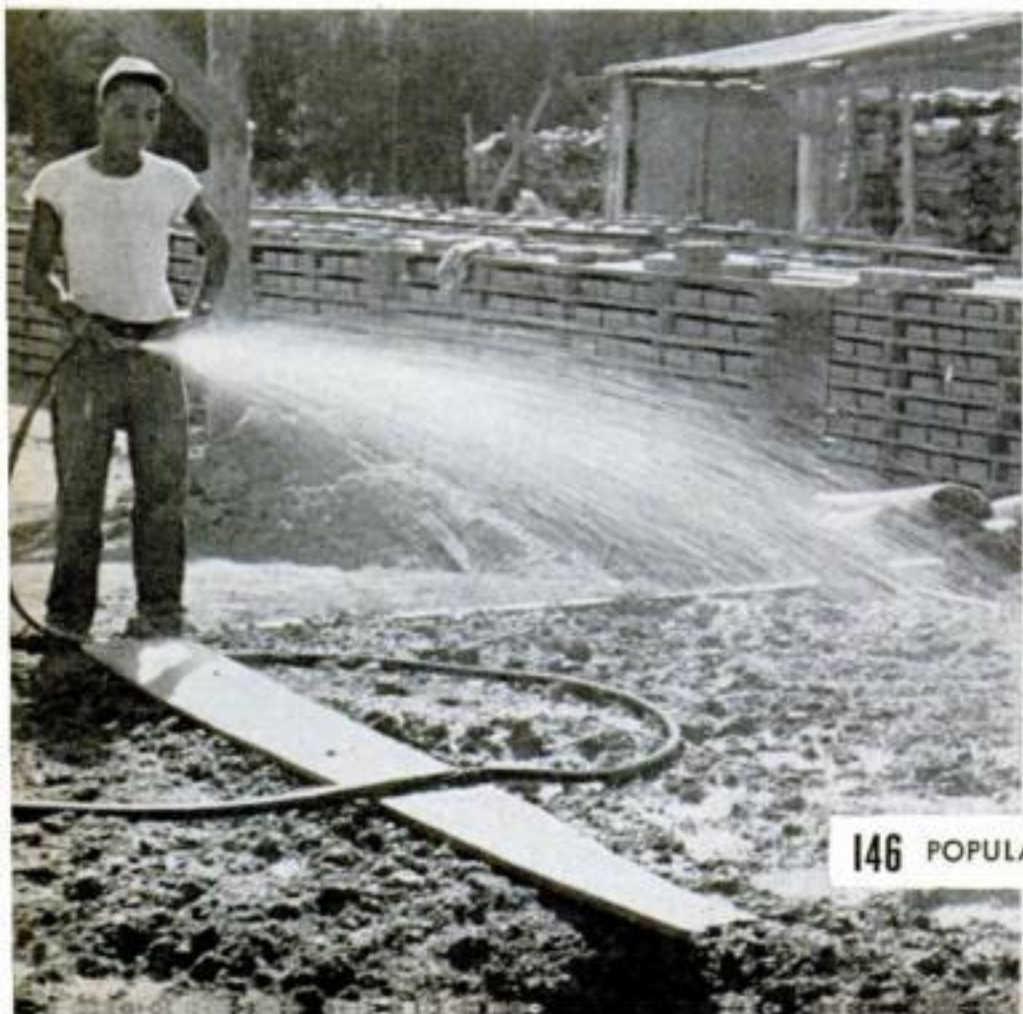
existed in the original buildings. Wooden structures and building parts could be reproduced with relative ease, and even paint colors could be re-created, but nowhere in the world could modern brick be found to match that surviving in the 18th-Century walls, foundations, and chimneys still standing at the former capital city of Virginia. To repair, restore, and rebuild the old houses, taverns, governor's palace, capitol building, and garden walls, hundreds of thousands of "new" 18th-Century brick would be needed.

Studies of old records and excavated material showed that the brick used was made on the spot, from the Tidewater clay dug within the town itself. So the restoration experts decided that to get new bricks to match in color and texture the original ones it would be necessary to manufacture them from Williamsburg clay by the methods in use 300 or so years ago. But who could make Colonial brick in this modern day?

Someone remembered a North Carolina brickmaker who had, on previous occasions,

Wetting down clay that has been brought from Williamsburg to the nearby brickmaking plant.

Clay for the bricks is mixed in this primitive pugmill. Power for it is supplied by the mule.



Mystery

Immediately after being molded, the clay billets are dumped on boards as shown at right. These billets are slightly larger than finished bricks to allow for shrinkage during the drying period.



turned out true handmade brick for restoring old buildings. So Nathaniel Hedgecock was persuaded to abandon his regular business of making modern brick at Winston-Salem, N. C., and to take charge of brick production for the restoration of Colonial Williamsburg.

He says that his biggest problem is to keep from making modern brick, and he explains that every labor-saving shortcut that tends to creep into the work has an effect on the final appearance of the product.

Glazed-end brick, for instance, provided just about the toughest problem. The original walls of the Capitol and other buildings contained glazed headers. These were

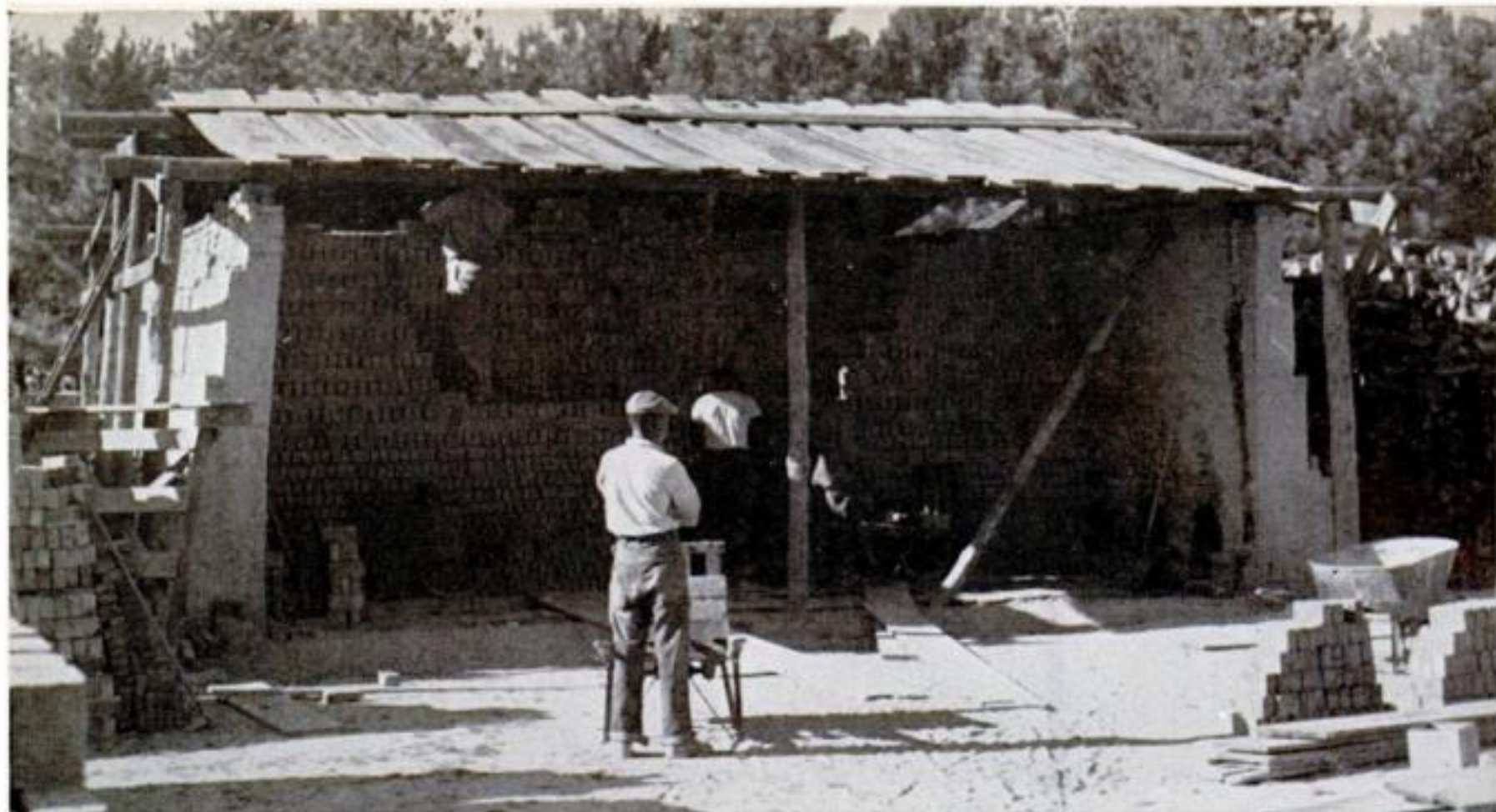
bricks placed so their ends were exposed and those ends were covered with a glass-like glaze that made a wall glitter in the late afternoon sun as if it were set with iridescent jewels. Various chemicals were tried and countless burning experiments were carried out before the answer was found to be simplicity itself. The glazed bricks were simply the ones stacked in the kiln so their ends were fused by the hottest part of the fire!

The first step in making a brick to duplicate a Colonial original is to get suitable clay. Throughout the Tidewater section of Virginia, Hedgecock explains, clay suitable for making excellent brick is available. But only in Williamsburg itself is found the

The brick molder stands in a pit so that his hands will be on a level with the pugmill.

Bricks in these stacks are air-drying. After about two weeks they are hauled to the kiln.





The kiln above is a replica of those used in Colonial times. When it has been loaded with

about 60,000 air-dried bricks, the open front will be bricked up and wood fires started.



Inside the kiln, brickmaster Nathaniel Hedgecock examines an air-dried brick before firing. Opening behind him is used to feed wood to the kiln fires. Inset at left shows a glazed header brick that puzzled brickmakers for a long time. Now they've found that the glasslike coating at the top end forms on ends of bricks that are closest to burning wood during firing.



clay that will produce the desired colors and textures. So clay is dug in the city and trucked to the brickmaking plant a mile or so out in the country.

There it is dumped into a pit dug in the ground, watered down by sprinkling, and kept wet for a week. No screening is done, but care is taken not to include large stones, old brick fragments, or other undesirable material. After a week in the pit, the clay is transferred to the pugmill.

This mill, built strictly along Colonial lines, is a crude-looking affair consisting of a boxlike container about four feet high and built of rough boards. Inside it rotates a vertical wooden post studded with iron bars. Power is provided by a horse or mule walking in a circle, the animal being hitched to a boom extending out from the post. Water is added to the clay in the pugmill, and after thorough mixing wet clay of exactly the right consistency for molding oozes from an opening at the ground level.

The molder stands in a pit dug in the ground, so his hands will be at a comfortable level. He picks up a cone of clay, long experience enabling him to judge the quantity accurately, rolls it in sand, and plops it into a wooden mold that has been dipped into water and then into sand. He presses the clay firmly into the mold cavities and levels the exposed surfaces. A molder can shape 3,000 bricks a day.

The clay billets, somewhat larger than

the finished bricks will be, to allow for shrinkage in drying, are dumped immediately from the molds, piled in rows on board shelves, and allowed to dry for about a week. Although the "green" bricks shrink considerably during the drying, they hold their size well during the later firing. Some crack during handling or drying and are thrown back into the pugmill and reworked.

The wood-burning kiln in which the bricks are fired for 10 days is a house-size brick-and-mortar structure having a removable wall and a series of fire openings extending along two opposite sides. The air-dried green bricks are stacked carefully to form tunnels connecting these openings, and spaces are left between each brick so heat and gases from the fire can work upward among them. When some 60,000 bricks have been stacked in the kiln, the open side is closed with a wall of bricks and clay mortar. Wood, mostly oak or other hardwood, is the fuel.

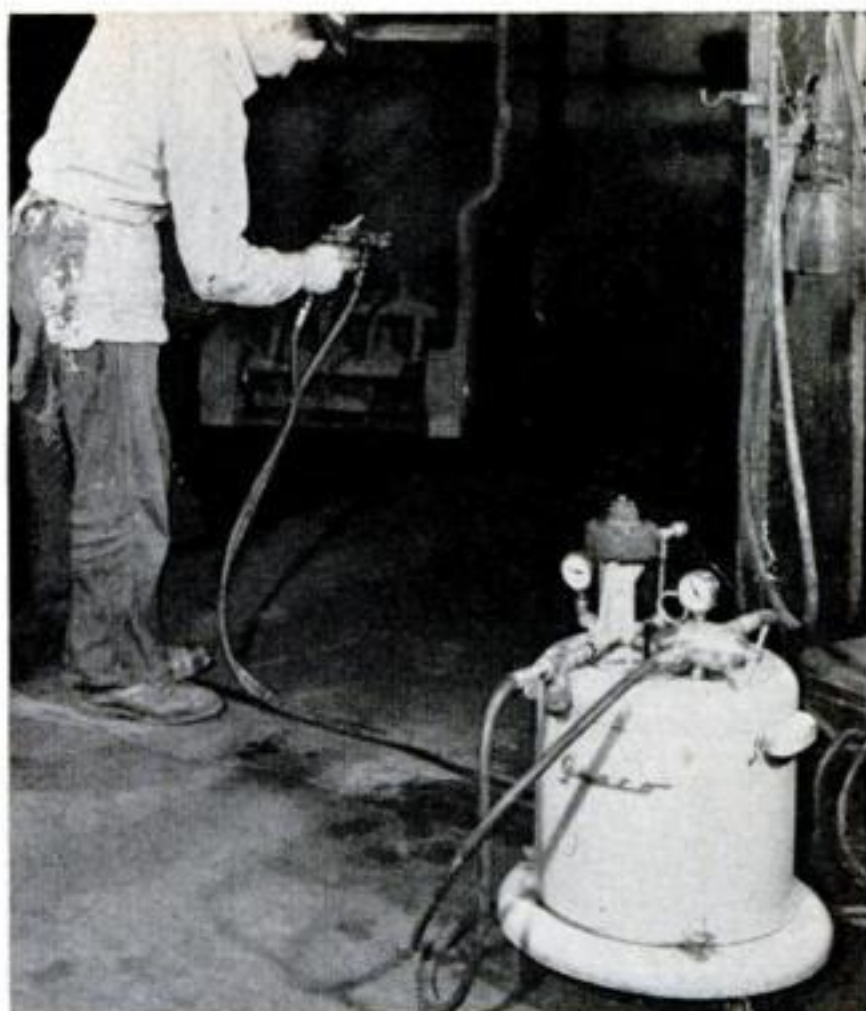
In the 10-day burning, the bricks become white hot, and the surfaces of those nearest the fires actually melt and become transformed into a sort of glass—producing the famous Williamsburg glazed headers. After the firing period, the kiln is allowed to cool, and then the wall is torn out and the finished bricks wheeled to storage piles.

Weathering Mellows the Brick

No attempt is made to "antique" the bricks made for the restored buildings, but Hedgecock says that the longer a brick can be left to weather, the better it will look. Some of the ones he has made have been stockpiled for 15 years, and eventually will be incorporated into buildings. The action of sun and weather darkens the brick surface and produces a mellower appearance, whether the brick is in a building wall or a storage pile.

The problem of re-creating old Colonial walls and chimneys does not end with the firing of the kiln. According to Hedgecock, a piece of brickwork can be made or ruined by the way it is laid up. The Williamsburg restoration is a monument to the skill of modern bricklayers as well as to the brick-makers.

The cost of producing modern Colonial brick in the true "handmade" way is many times that of making modern brick by present-day production methods. But, after a visit to Williamsburg you will agree the final result is worth it. END



Paint Can Is Spray Source

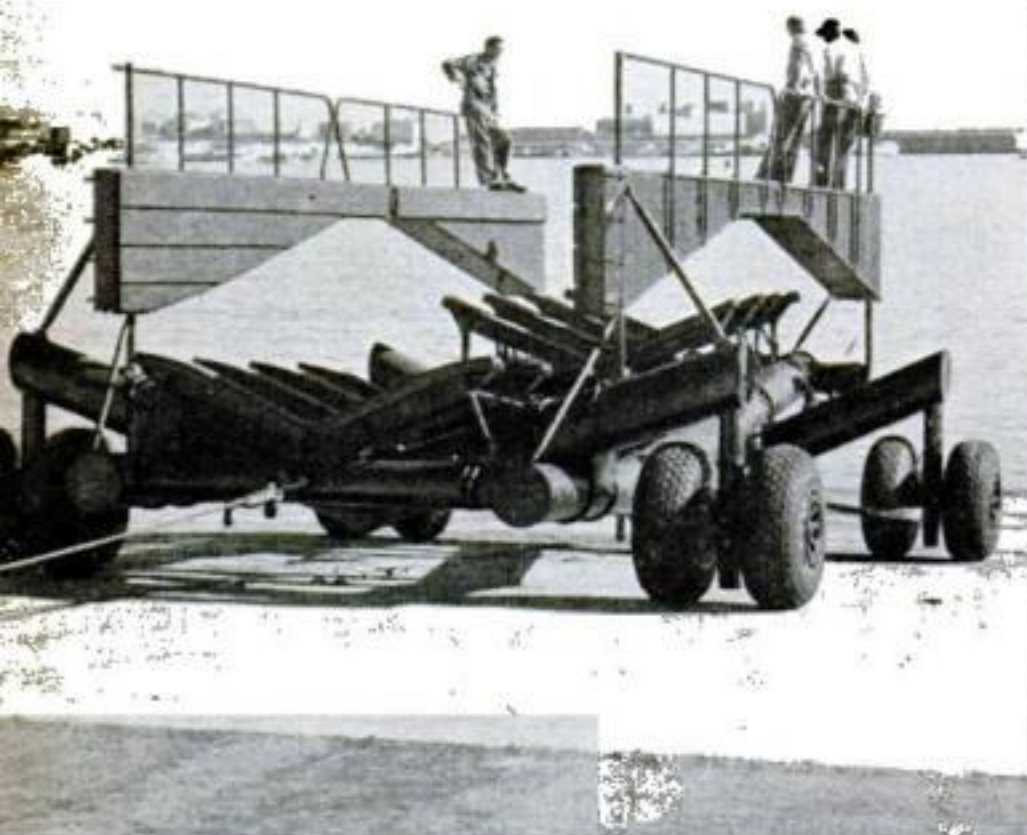
THIS workman is spray-painting furniture with a Paintmaster that fits right over the original container—doing away with messy paint transfer. Made to fit either 5-gal. cans or 55-gal. drums, the units have agitators to keep the paint always stirred. A rotary air-driven pump—not air pressure on the paint—moves the paint to the gun. Lower pressures are said to cut "overspraying." Gray Co., of Minneapolis, makes it.



Scooter for Package Pickup

THE three-wheeled Globster pickup pictured above is powered by a Continental Red Seal engine with Maximatic (automatic) transmission, said to provide quick starting, good cruising efficiency, and easy hill climbing. The manufacturer, Globe Corp., of Joliet, Ill., claims the 215-pound vehicle is easy to park and can turn in a six-foot circle.

World's First Turboprop Flying Boat



Plane's launching cradle, weighing 15 tons, has its own air brakes, rolls on eight tires. Secret of boat's performance is high power and slim hull, obvious in the flight photo above.

XP5Y-1 rolls tailfirst in cradle down ramp into San Diego Bay. She can carry rockets, mines, torpedoes, bombs, other weapons. Armament includes cannon in four sides, one tail turret.



Navy's newest flying boat "planes" on water only 10 seconds after pilot opens his throttles.

THE world's first turboprop flying boat, a 60-ton mammoth with a top speed of more than 350 miles an hour and a bow like a cruiser, took to the air the other day from San Diego Bay in California. Its performance was nothing at all like that of a conventional flying boat. In a shade under 20 seconds after the pilot poured the coal into its four engines, the huge patrol bomber was

Engines supply 22,000 shaft horsepower for 8 contrarotating props. Exhaust gases give added thrust as they issue from engine tailpipe. Search gear includes both radar, counter-radar.

airborne. That's only about two seconds slower than the take-off time of an Air Force F-80 jet fighter.

First of a new family of hulls built for the U.S. Navy, the Consolidated Vultee XP5Y-1 can be landed in waves eight feet high. Designed for long-range antisub and search-rescue missions, it is powered by four Allison XT40-A-4 gas turbine engines.

Plane's tail rises more than 40 feet with hull in cradle. Hull's aft sweep upward helps break water suction at take-off. Plane can tote 2½ times the load of Navy's wartime Coronado boat.

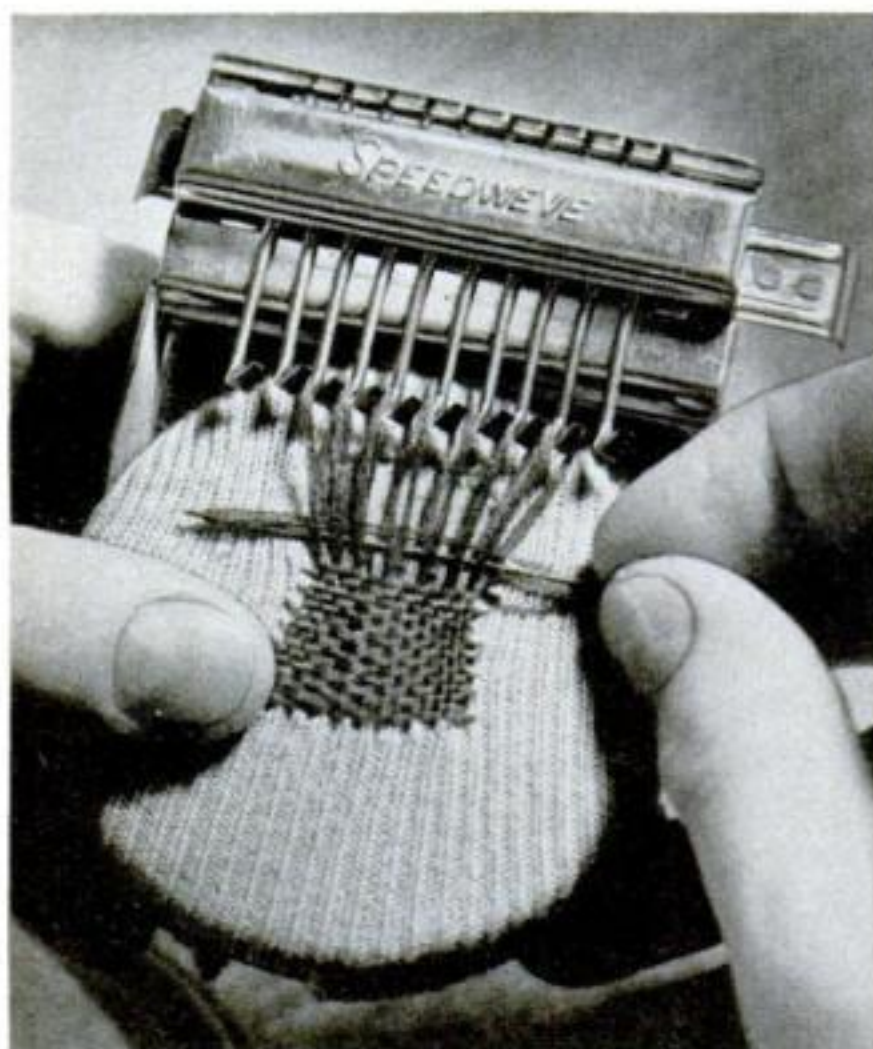




Jets Get 1,000-Mile Tanks

MOUNTED on bomb shackles under the wings, two extra 230-gallon fuel tanks now boost the combat radius of the U.S. Air Force's Republic F-84E jet fighter beyond the 1,000-mile mark. They supplement

auxiliary wing-tip fuel tanks of the same design and capacity. The latter, together with fuel carried within the craft, gave it a previously announced combat radius of 850 miles. The newly equipped plane (above) can drop all four external fuel tanks in flight for maneuverability in combat.



Tiny Loom Mends Holes

CALLED the "smallest loom in the world," the British-made Speedweave darning machine above makes short work of darning holes in silk, wool, or linen. Mechanism seen at the top of the picture alternately raises and lowers the rows of threads, reweaving the fabric as shown. To illustrate the operation of the device clearly, new thread of contrasting color has purposely been used. When the color of the mending thread matches the fabric, it is hard to distinguish the rewoven portion from the rest.



Sprinkler Does Many Jobs

FERTILIZER, weed killer, or insecticide may be injected into the stream of a new four-in-one sprinkler, above, from an auxiliary one-quart reservoir of transparent Tenite plastic. The double-armed revolving head distributes plant food evenly over a garden. To kill weeds or bugs, a hand-spraying head on a six-foot hose is substituted. With the plastic jar detached, and the revolving head in place, the device becomes a conventional lawn sprinkler. The Misch Mfg. Co., Mishawaka, Ind., makes it.

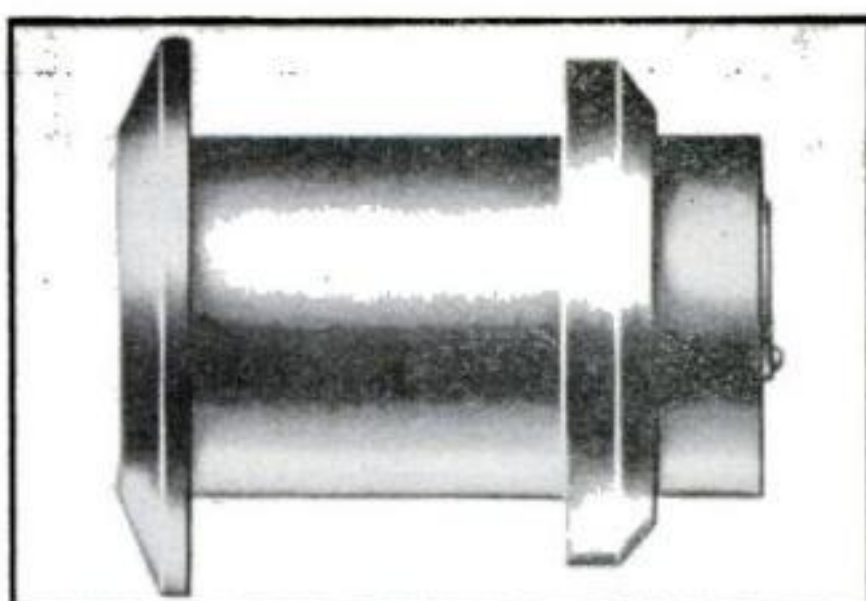
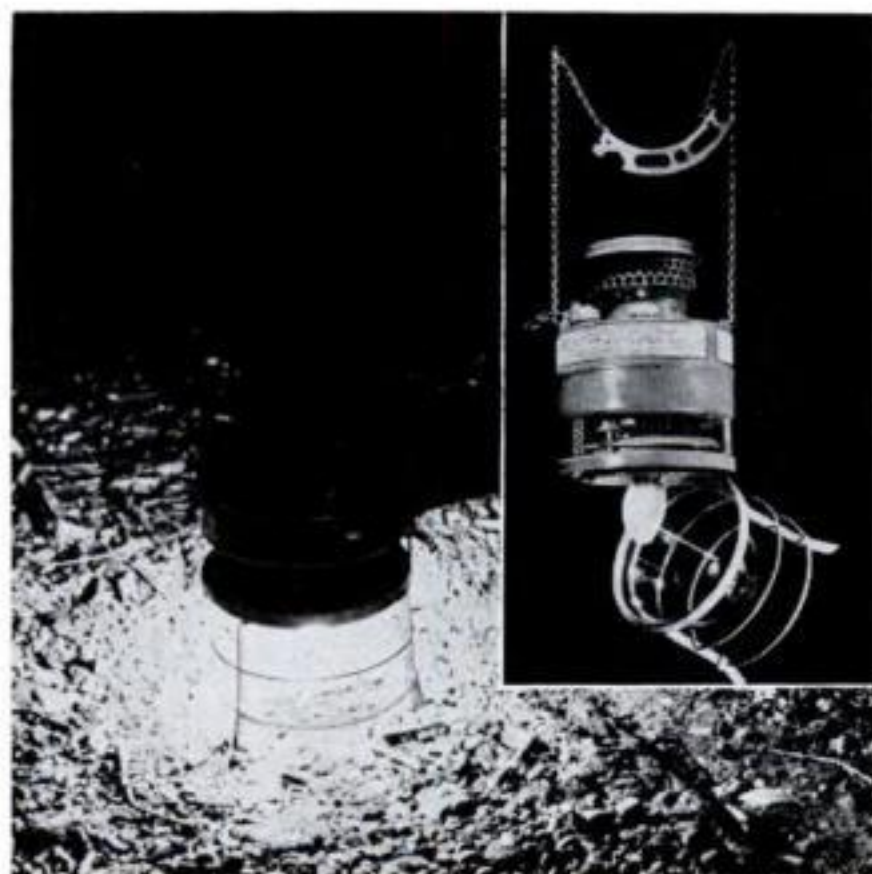


Chilled Varnish Dries Better

YOU'VE heard it said that warmth speeds drying of varnish or paint. But H. A. Calahan, of Rye, N. Y., doesn't hold with that theory. He recommends that his marine varnish be chilled before applying.

The varnish is then colder than the surface to which it's applied. This, Calahan claims, causes the varnish to dry "inside out." The part immediately adjoining the wood dries first. While this is happening, the volatiles are permitted to escape. Last to dry are the nonvolatile constituents that form the tough skin.

The manufacturer says you may or may not get good results from chilling other varnishes. His is especially prepared for such use. It sells for \$2.75 a quart.



Peephole Is One-Way Viewer

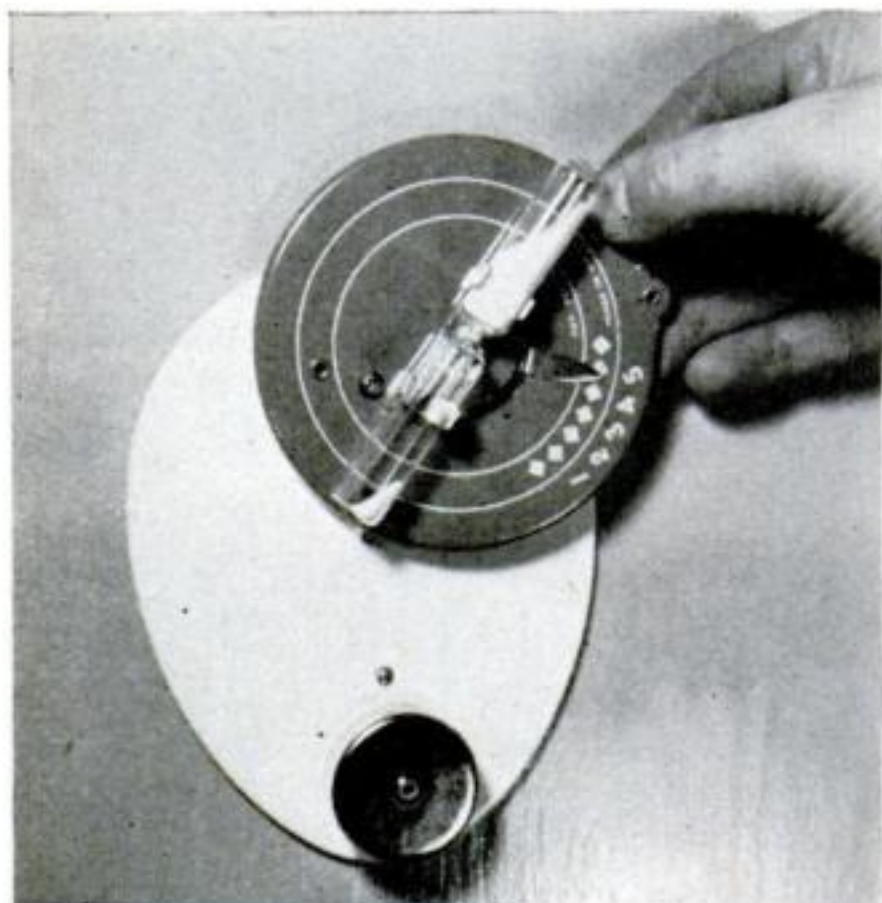
WITH the peephole cylinder shown at top, you can see not only the head of a visitor outside your door, but get a full-length view, as in drawing at right—and without his knowing it. A system of wide-angle lenses does the trick. Easily installed in a 1¼-inch hole in a wood or metal door, the device has a pivoting shutter on the inner side that closes noiselessly by gravity, and a locking ring makes it tamperproof. The B-Safe Look-out is made by the Danca Products Corp., of N. Y., and sells for about \$5.

GI Lantern Is Upside Down

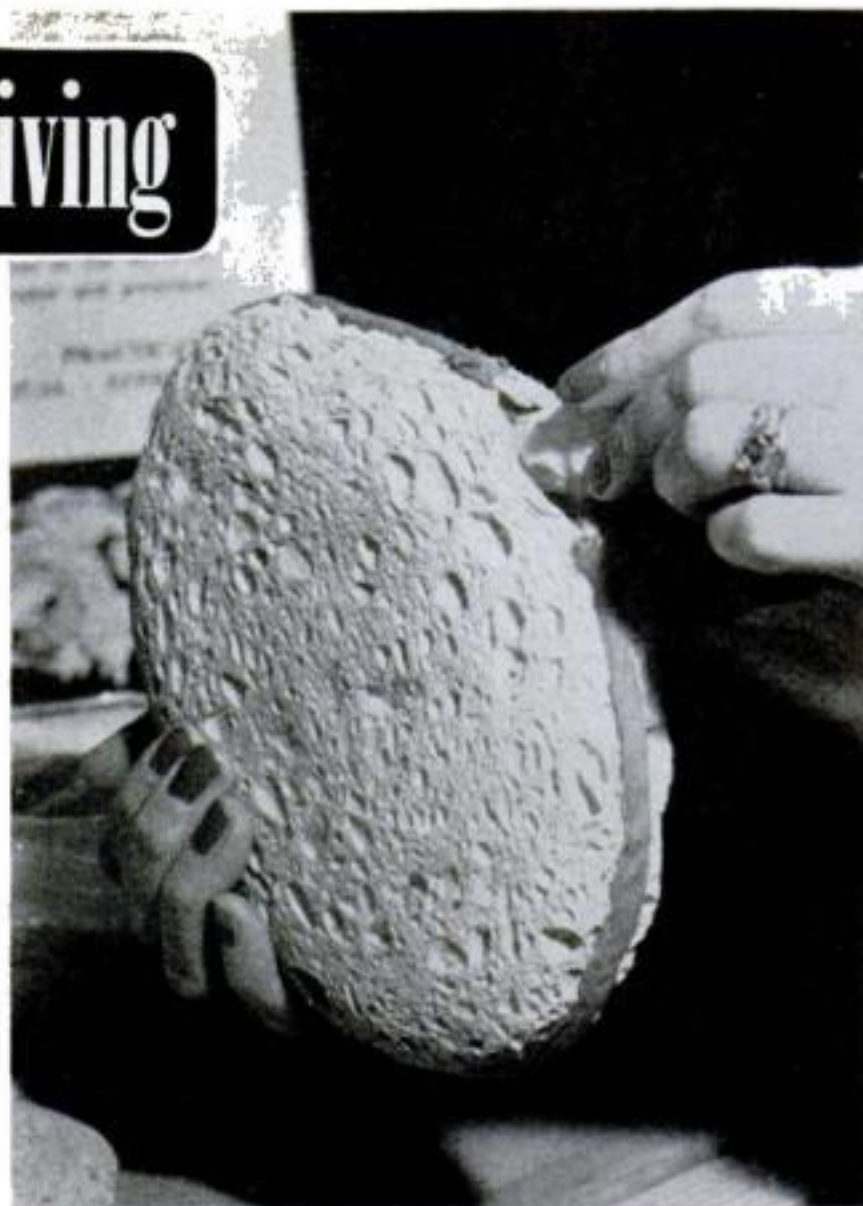
WITH the light on the bottom and the fuel tank on top, a gasoline lantern developed by the Quartermaster Corps eliminates the shadow usually cast by the tank. The glass globe covering the mantle at the bottom is encased in a metal guard that serves as a tripod for setting the lamp down, as at far left. The handle, seen in inset, is also a wrench for making adjustments. The lantern has been lab tested at temperatures from 69° below zero to 150° above.



Aids to Modern Living



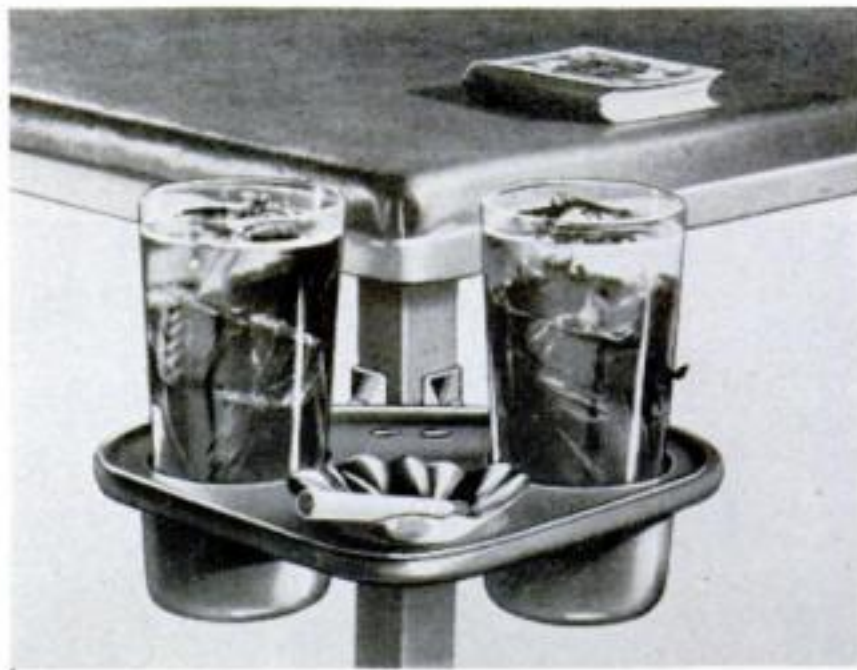
Egg Timer Rings Bell. To time an egg with this device, a sandglass mounted off-center on a disk is swung upward against a metal stop, as above. At time indicated by a minute pointer, sand trickling through the glass causes a shift in weight, pulling the disk downward to hit a bell. Miles Kimball Co., Oshkosh, Wis., prices it at \$1.



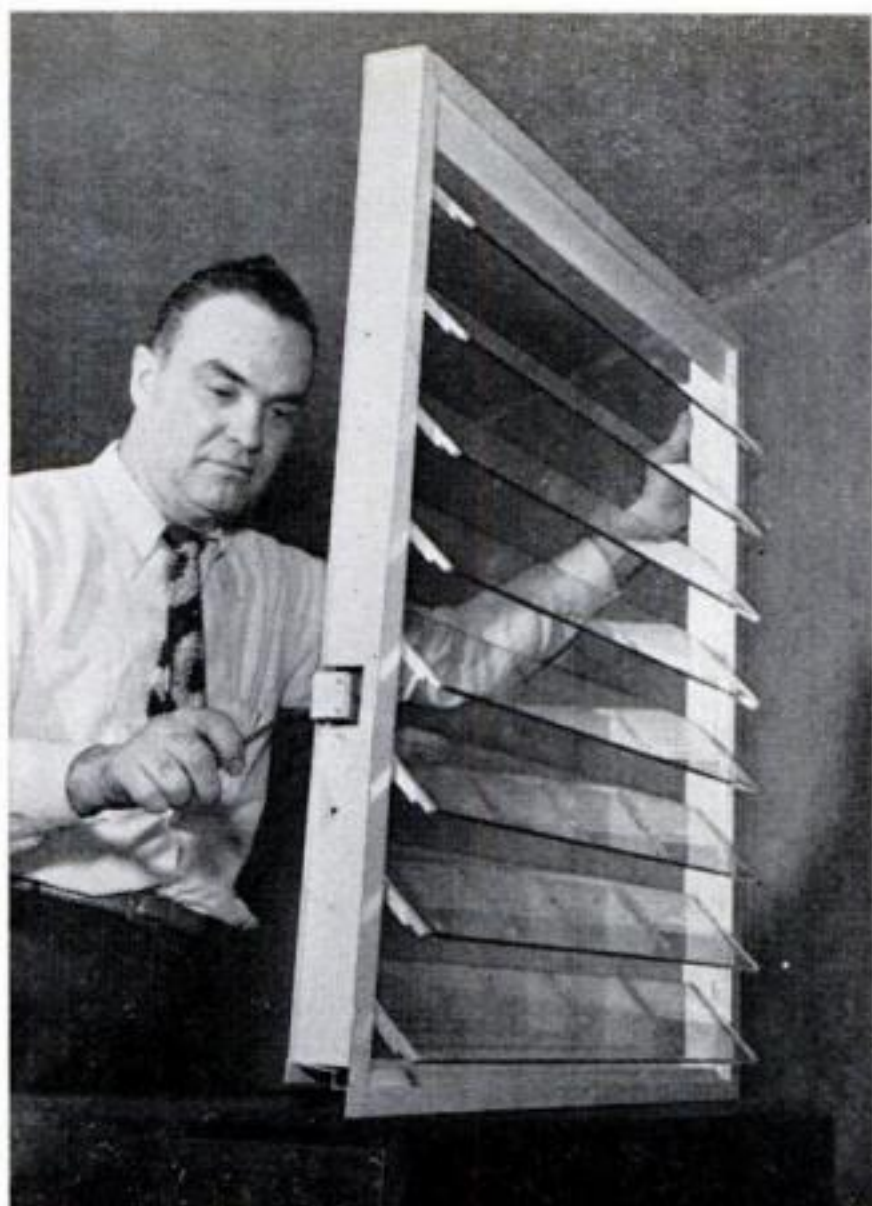
Sponge Uses Soap Scraps. Left-over soap scraps won't be wasted if they are slipped inside this hollow synthetic sponge, and used for washing clothes or dishes. When squeezed or shaken in water, the sponge turns soap bits into lather. A British product, the new soap-saver comes in a variety of colored bindings.



Ironing Board Fits Suitcase. For travelers, or those who have no room for a full-size ironing board, this 27-inch midget folds to 12 inches for storing. An iron and ironing pad can be stored between the folded boards, as shown in inset. Priced at about \$3, Trav-L-Bord is made by Andrea Mfg. Corp., of Miami, Fla.



Tray Clamps on Table Leg. Secured to a card-table leg, this serving tray keeps drinks out of the players' way. Made of plastic and chromium-plated steel, it has two deep wells for holding glasses, and space for an ash tray in between. Offenbach and Reimus, of San Francisco, sells a set of two for about \$2.80.



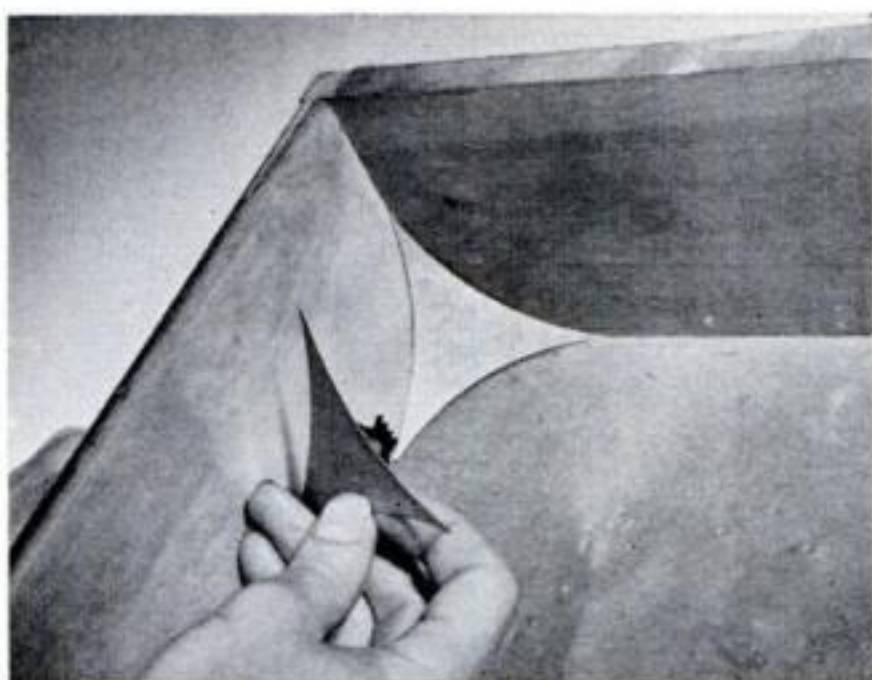
Window Has Movable Panels.

By adjusting the four-inch, plate-glass panels that make up this window, you can regulate ventilation and avoid direct drafts. The panels are opened outward by a handle, can be locked in any position, and fit into either steel or aluminum frames. Robert Prill, of Chicago, is the inventor.



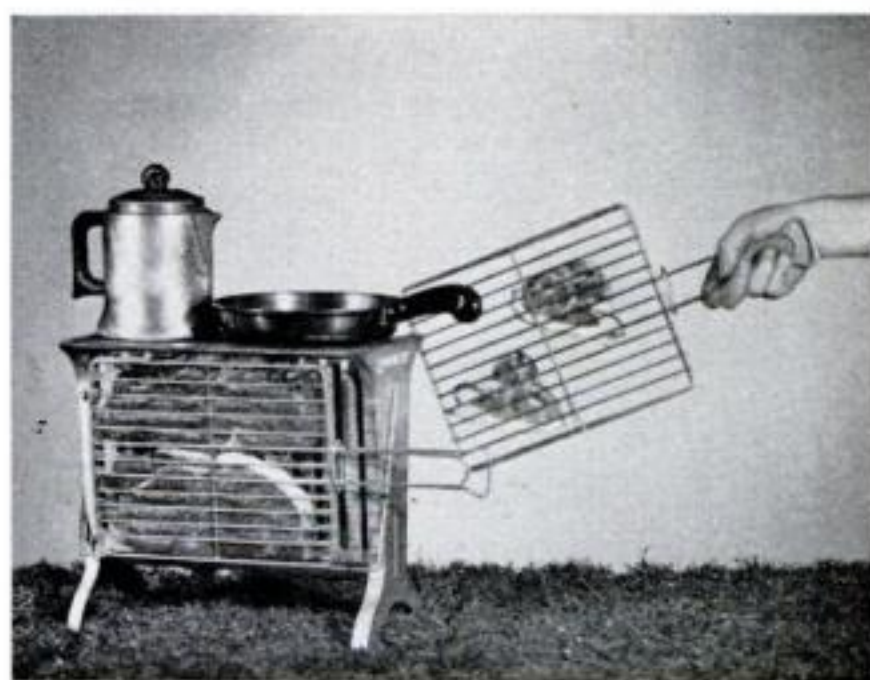
Bag Keeps Laundry Moist.

There's no need to hand-sprinkle clothes for ironing if you put them in this plastic bag. Just stuff the dry laundry in, add a cup of warm water for each five-inch layer, and close the top. In a few hours the clothes will be evenly damp. Humphrey-Callander Co., Clinton, Ill., prices the Damp Champ at \$2.



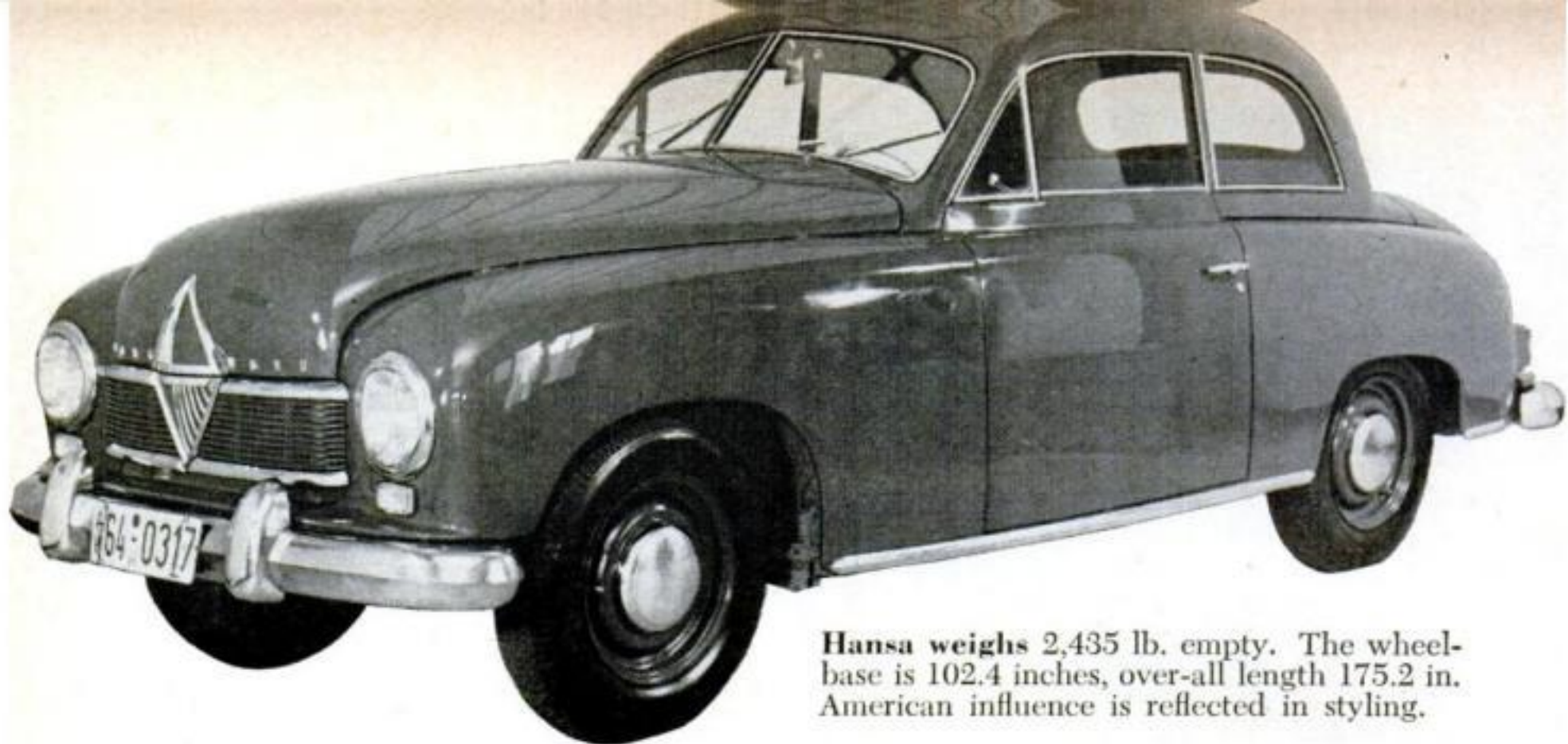
Shields Make Corners Round.

Drawer and stairway corners are easy to keep clean when rounded with a triangular metal shield as above. Thumb pressure forces the gripper teeth on the underside to bite into the wood. The Ace Specialty Mfg. Co., of Minneapolis, makes the tan-colored Presto shields to sell for 29¢ a pair.



Barbecuer Has Vertical Grills.

This portable, charcoal-burning outdoor cooker prepares a whole meal at once. While steaks or other meats are roasting in vertical, stainless-steel grills on the sides, other foods can be boiled or fried on the top surface. Offenbach and Reimus, of San Francisco, sells the cooker for about \$8.



Hansa weighs 2,435 lb. empty. The wheel-base is 102.4 inches, over-all length 175.2 in. American influence is reflected in styling.

Germany Produces 48-Hp. Car



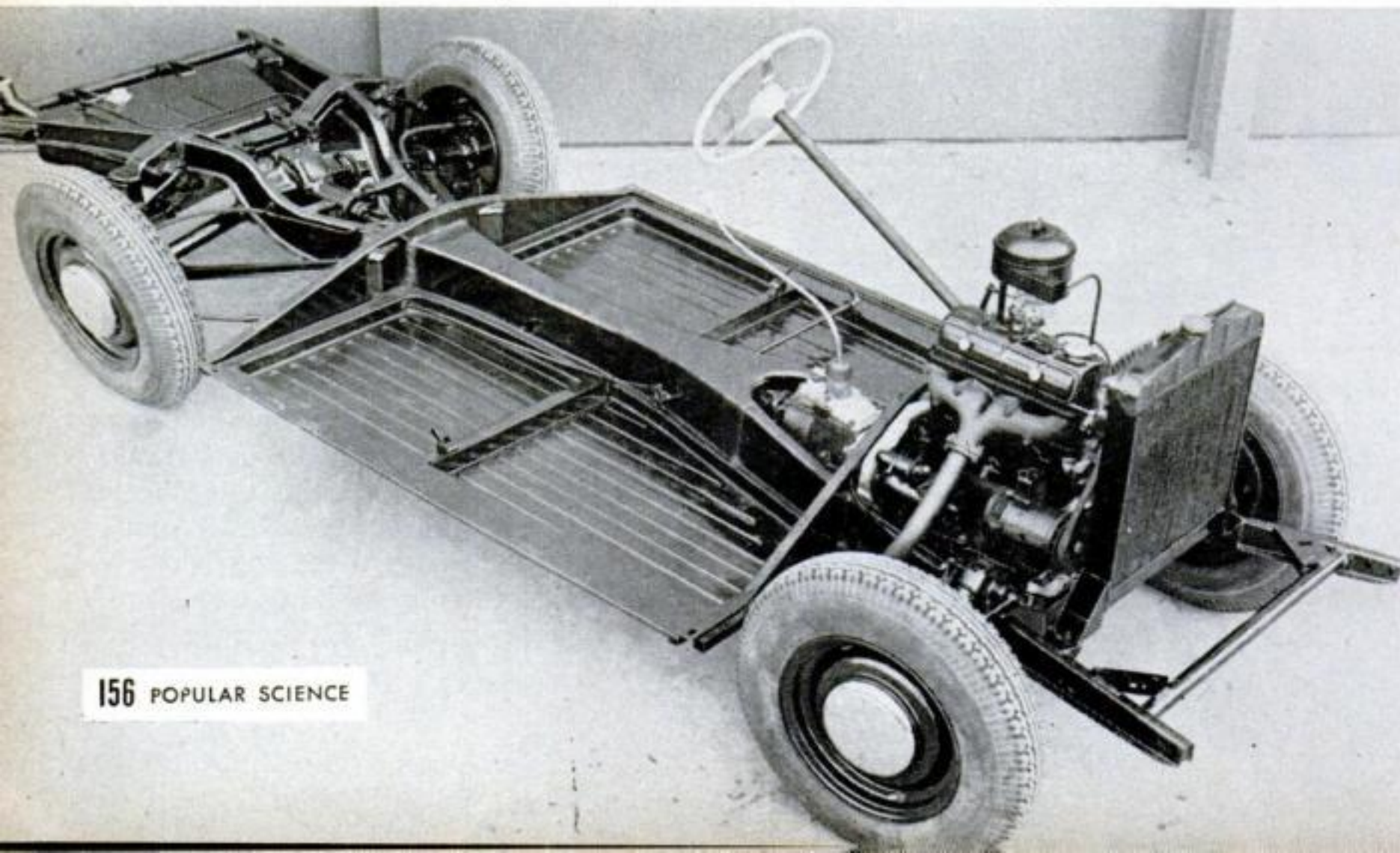
Dash is simple. For manufacturing economy, gearshift lever protrudes from floor tunnel.

A NEW car with a 48-hp. engine that gets 27 miles to the gallon is being produced in Bremen, Germany, by the Carl F. W. Borgward Automobile & Motor Works. Its top speed is about 75 miles an hour.

Known as the Hansa 1500, the machine has "central beam" construction of heavy channel steel. This is combined with a floor pan having three transverse reinforcing members. At front and rear two forks splay out from the beam to provide for wheel suspension and engine mounting. The car has independent springing on all wheels.

Big by European standards, the Hansa is regarded as one of the bellwethers in the revival of the German automobile industry.

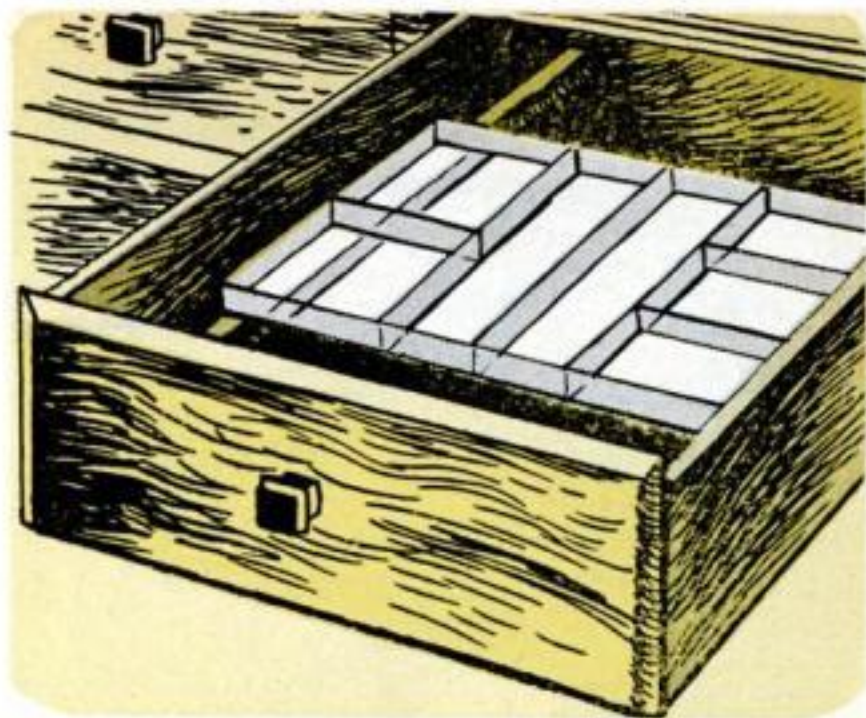
Rugged chassis carries a 4-cylinder, overhead-valve engine. Compression ratio is 6.3-to-1.



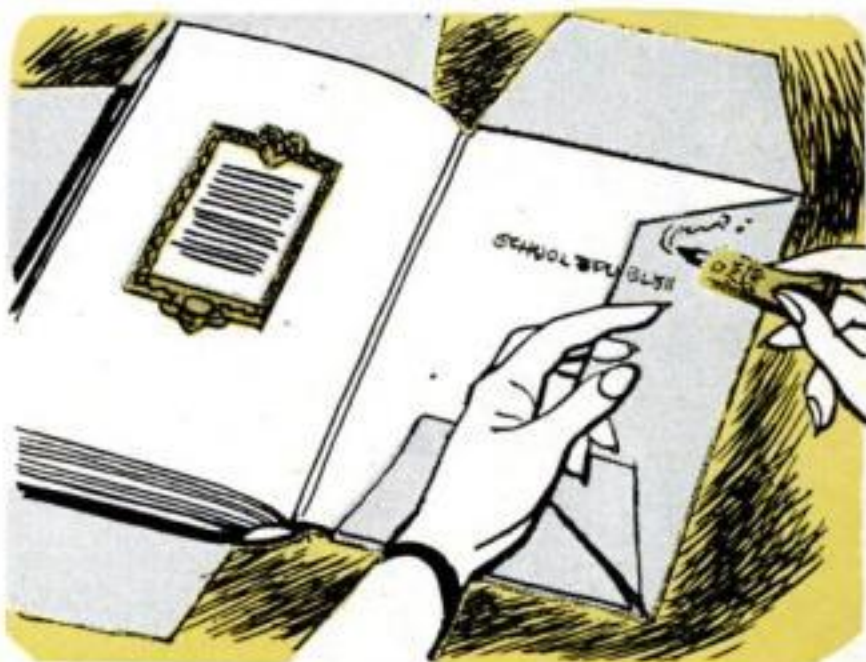
Keeping the Home Shipshape



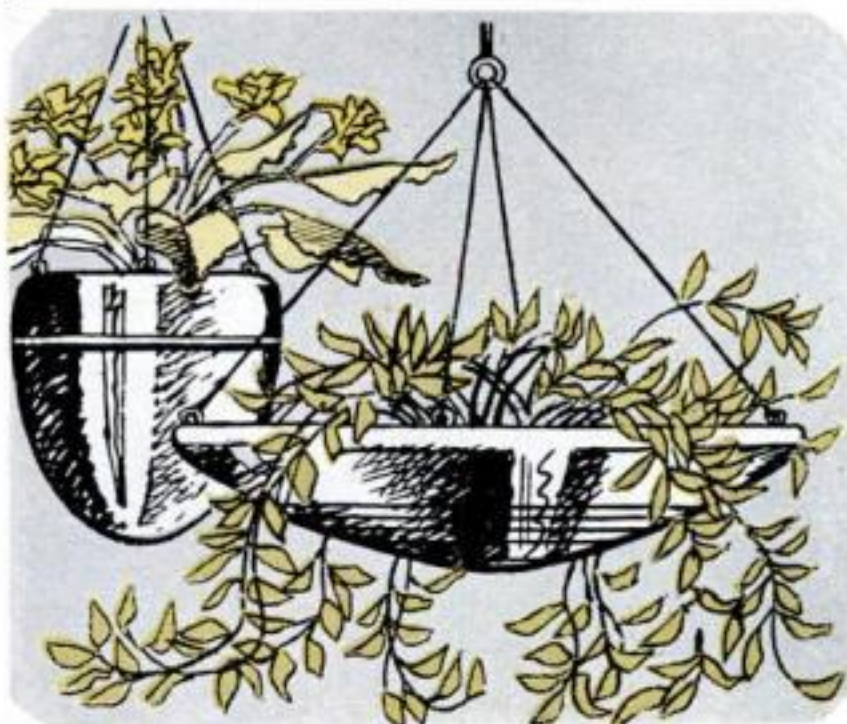
You won't keep pulling the wrong sheet out of the pile if you label each sheet for size. Use laundry ink and print the necessary identification on the hem.



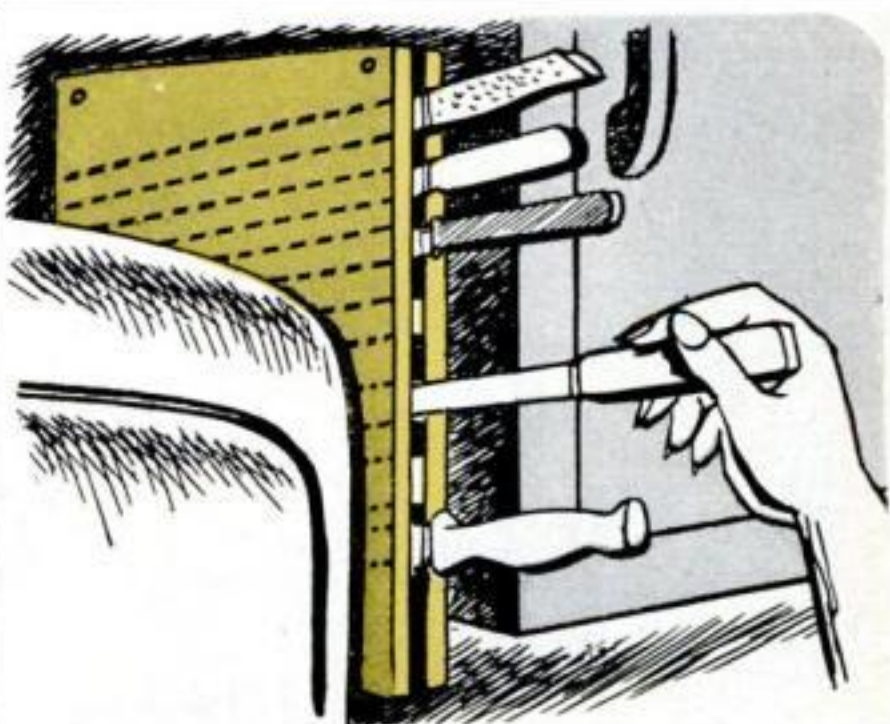
Plastic dresser-drawer trays can be made into sliding trays as shown above. Butt tray sections to width of drawer, and mount on a wood base. Tack rails to drawer sides.



Old plastic tablecloths make excellent protective covers for books. Titles are easily seen through the transparent fabric. Cut the plastic as shown and cement the flaps.



Attractive flower and vine holders can be made from discarded automobile headlamps and hub caps. They're good indoors or out. Polish or paint the metal to suit surroundings.



If you need a knife rack but don't have room for a regular one, sandwich cardboard separators between thin boards. The rack, about $\frac{1}{2}$ " wide, will fit in any narrow waste spaces.

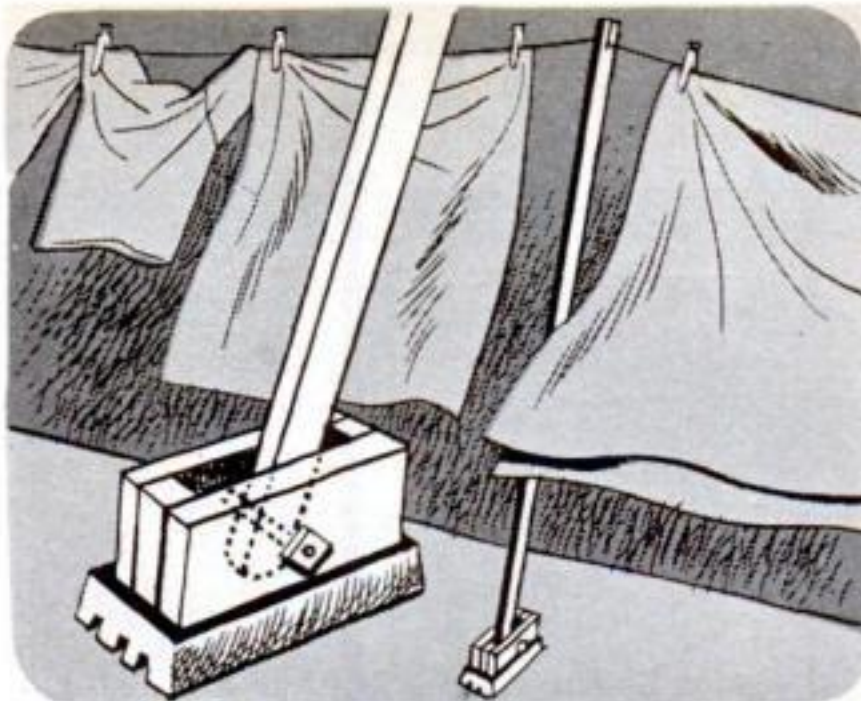
Please turn the page for five more suggestions.

JULY 1950 157

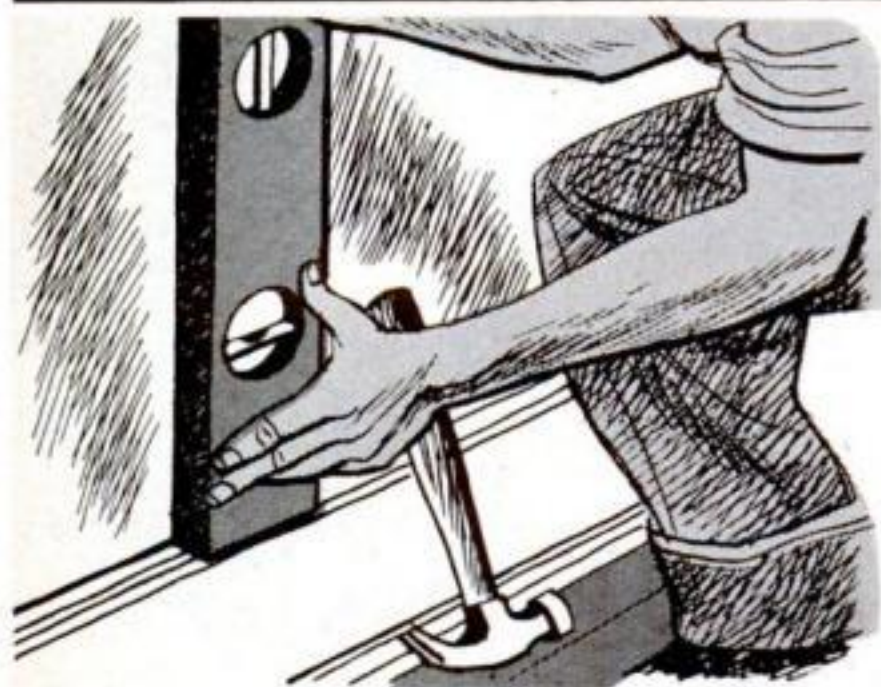
Keeping the Home Shipshape



Stubborn stains on silverware may resist efforts to remove them with ordinary cleaners. If soap or polishes fail, try a typewriter eraser. But don't use it on silverplate.



Here's a portable clothes pole that will rest securely on concrete. The base is a wooden frame with a rubber pad nailed underneath. The upright is bolted between the sides.



When you're trying to locate a wall stud to anchor a picture hook, look along the baseboard. Sometimes the nails that hold the base to the studs are visible. Nail directly above.



A handy cart for rolling the wash basket out to the line can be made by attaching wheels to the legs of a folding chair. The chair-cart folds up for compact storage.

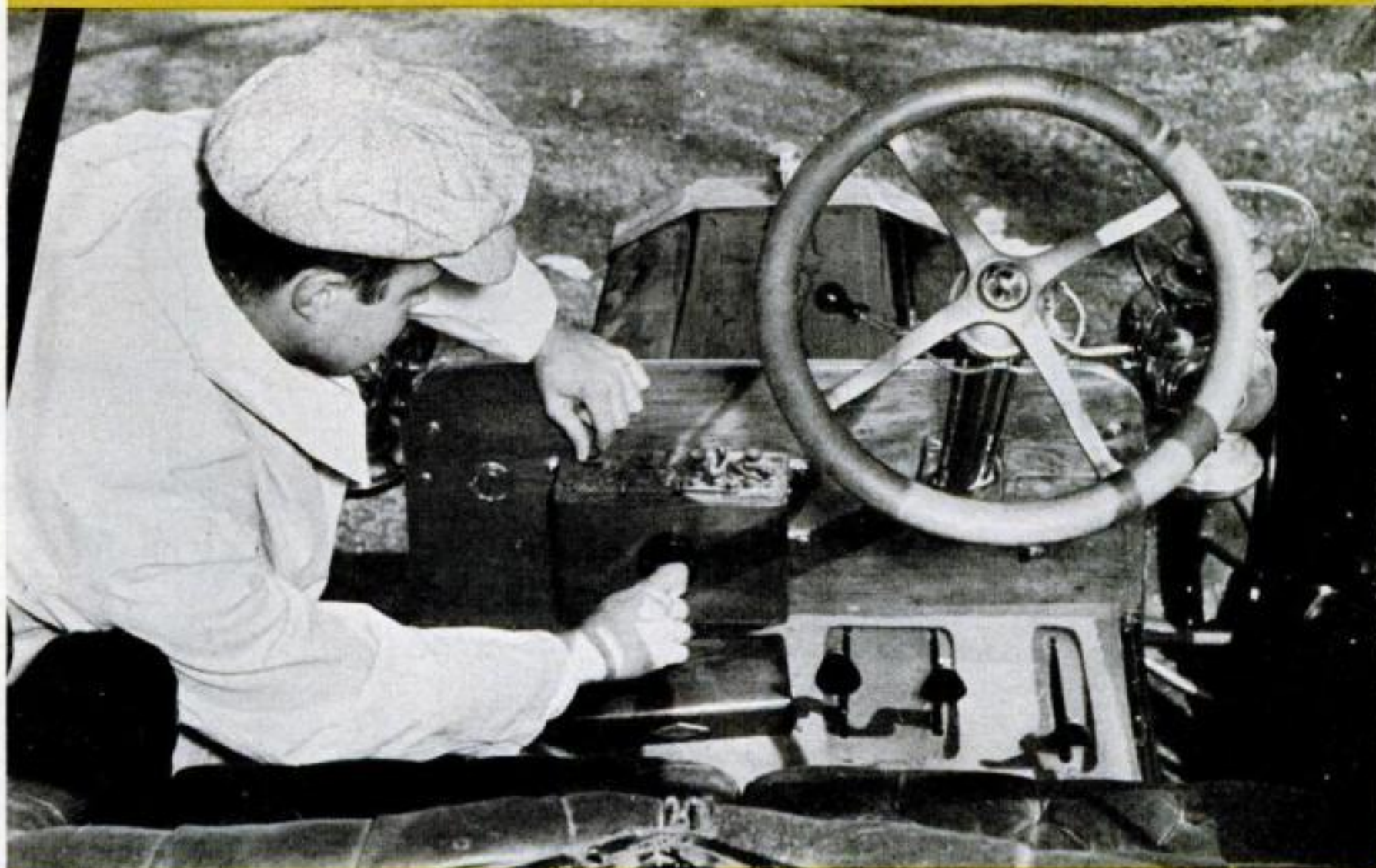


If you need a special tint for water-soluble paint and can't find the exact shade in the paint

store, try vegetable colors. One of your food colors may be the shade you want.

Mechanics and Handicraft

REG. U.S. PAT. OFF.



The accessories built for grandpa's car are in an automotive museum now. See page 164.

AUTO HINTS

Starting on the next page, you'll find 17 pages of useful information and entertaining reading for everyone who enjoys tinkering with a car.

What can you do with atomic playthings?
Kenneth M. Swezey shows you on page 183.

Do you know how to turn a door around?
Harry Walton will tell you on page 192.



JULY 1950 159



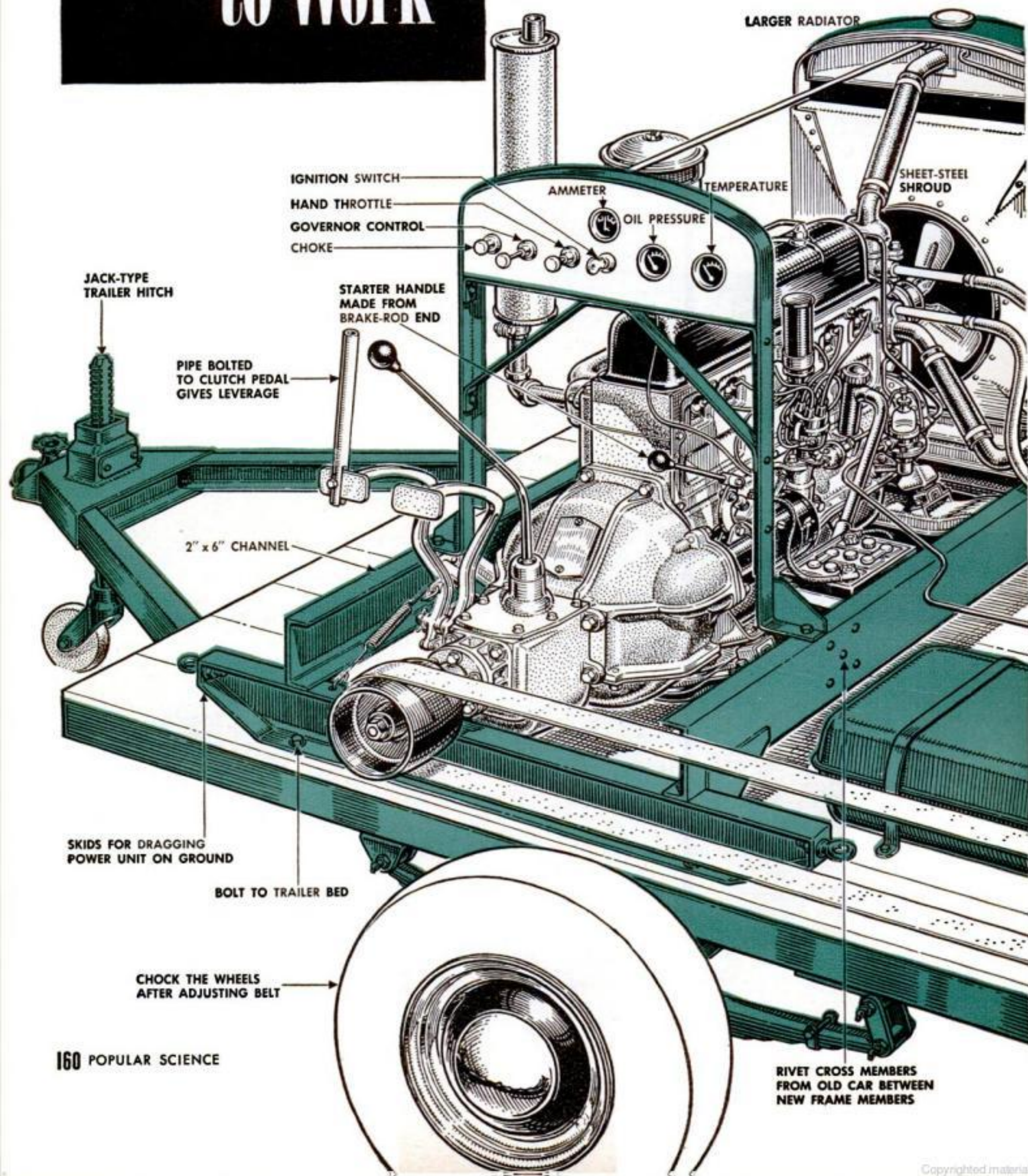
How to Put Old Engines to Work

By William G. Mitchell

Drawings by Stewart Rouse

A GOLD mine of useful power is piling up today in junk yards and used-car lots. Old car and truck engines, again available there at bargain rates, can be converted into stationary power plants.

Farmers, sawmill operators, and welding-shop owners have long used such engines. Cordwood saws, irrigation and stock-watering pumps, and corn shellers are all adapt-



able to this form of belt power. Small grist mills, planing mills, ski tows, and icehouse lifts can be run with them. Take a look around your place and you may find ways that they can serve you, too.

In the big sketch below you see how an ideal power unit might look. It includes practical ideas found in a lot of power plants in actual use. The converted engine in the smaller sketch represents a less ambitious undertaking.

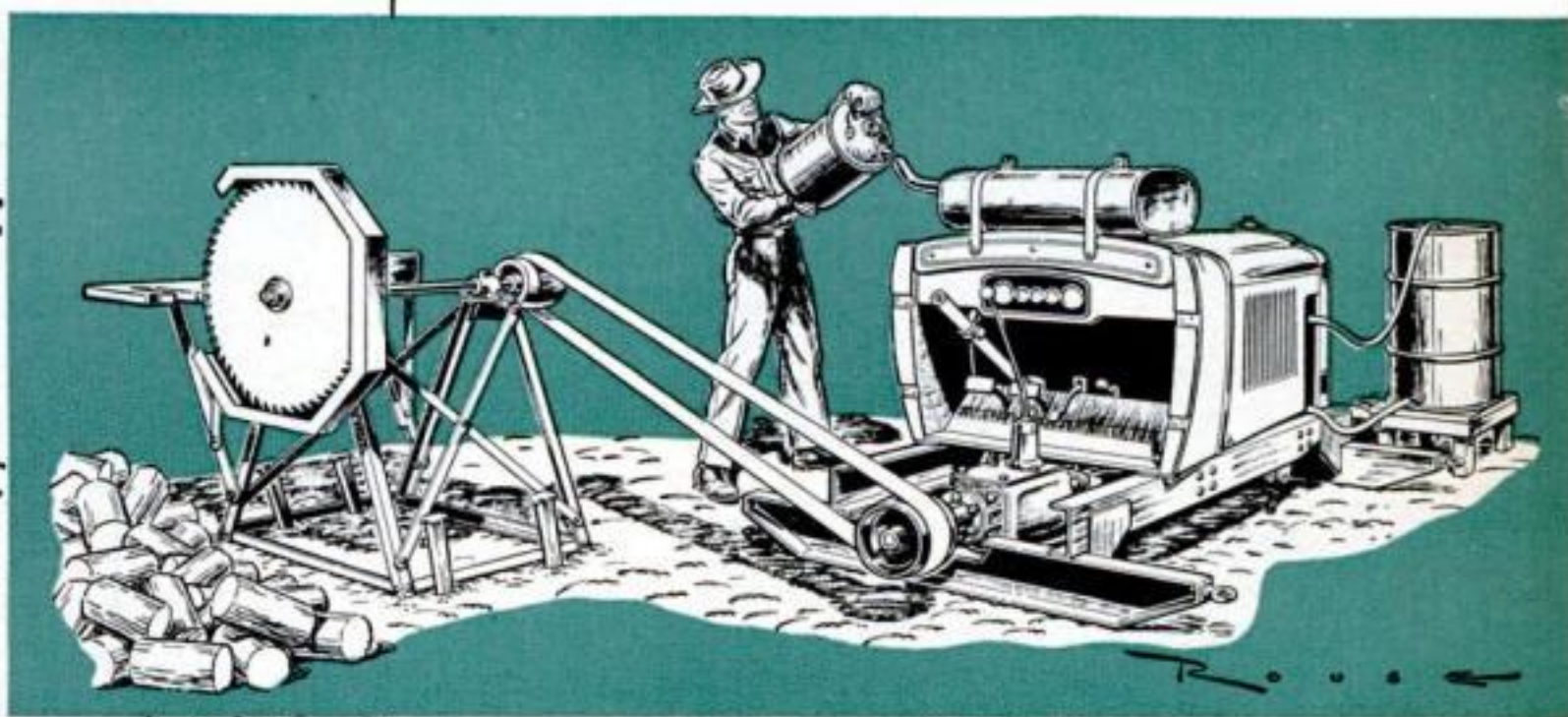
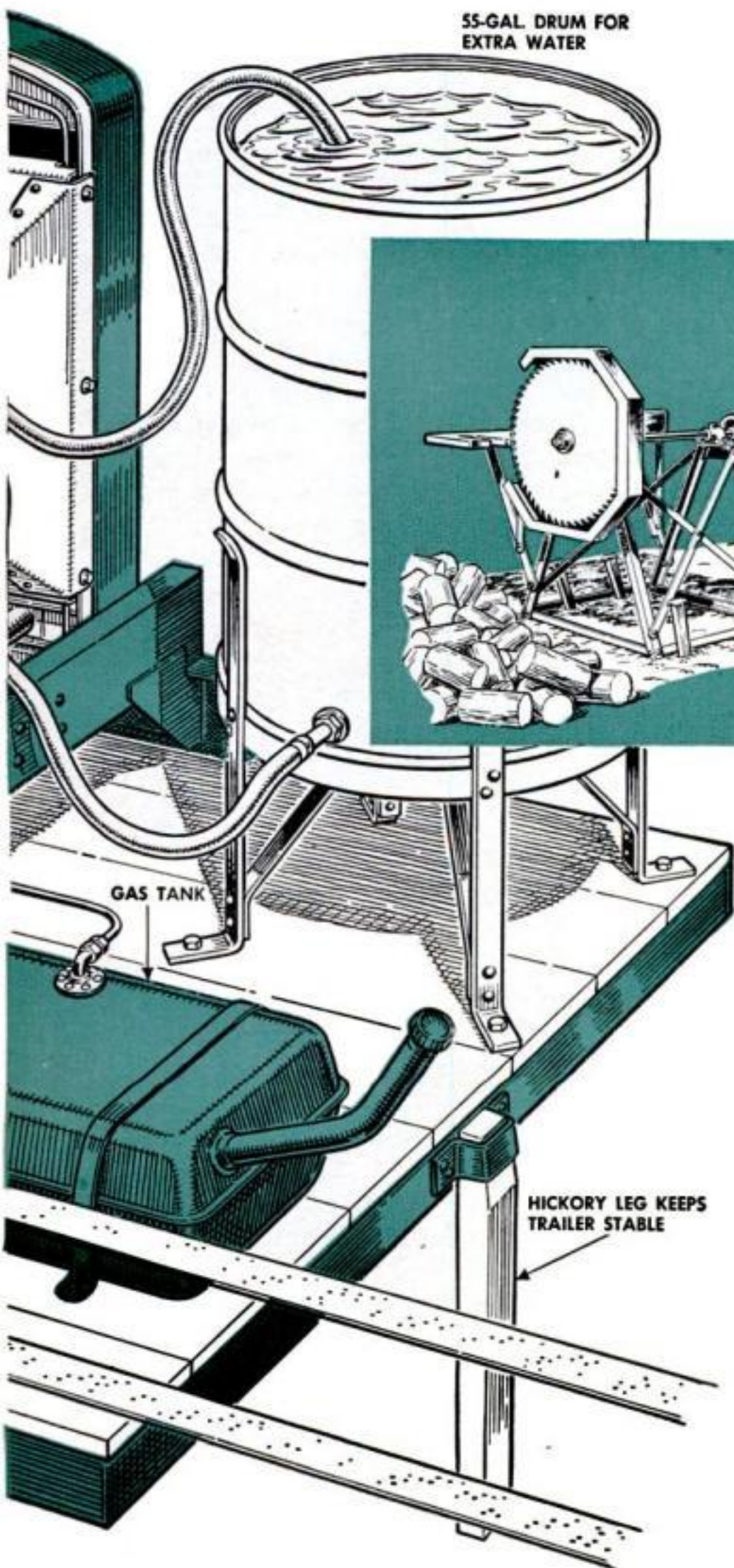
An automotive trailer is suggested if the

plant must be moved frequently from job to job. Removing a few bolts frees the trailer for other uses. Skids will enable you to drag the power unit short distances. Eye-bolts make hitching easy.

Because every mechanic has his own pet tricks and different engines have their special peculiarities, it's impossible to tell you, step by step, exactly how to make any particular conversion. But there are basic principles you should follow.

What horsepower do you need? Consider this question the first thing you do. The engine should fit the job. You wouldn't use a small engine to power a big sawmill, nor a truck engine to drive a small irrigation pump. If you don't know the power needs of your job, check with someone who does.

In general, don't expect the full horsepower claimed by the manufacturer of any



Gravity tank makes a fuel pump unnecessary in setup above. Cutting the frame on a line with the transmission and then adding skids is an easy way to adapt a car engine for stationary use. For portable power, you can set the unit on a trailer as at the left. In this case, a new frame is suggested to make the job more workmanlike. A larger radiator, a shroud, and extra water supply help keep the engine cool.

engine. Belt slippage will account for some loss. Then, too, a used engine won't give full power because of wear. Finally, you won't want to run it wide open for long stretches.

Mounting the engine. This can be done in a number of ways, but whatever you do, make sure the engine is secure.

Sometimes a car is simply stripped to the frame, one back wheel removed, a pulley fitted in its place, and the car becomes a power plant. It's usually more convenient,

however, to remove the engine and discard unnecessary parts of the car.

Many conversions are made by cutting the frame on a line with the rear of the transmission, leaving the engine mounted on the front section. Fenders, lights, and windshield are cut off, but the grille, hood, and instrument panel are left.

You can bolt a cut-off frame to a couple of heavy timbers, I beams, or heavy channel steel—preferably runner-shaped at the ends to serve as skids. For a permanent installation, you can then set this on a timber crib or bolt it to a shop or mill floor.

You might also install a new channel-

steel frame. Design it so the engine mounts will be the same as before, and be sure to install rubber vibration mounts in the original locations.

For portable power, mount the engine on a one-ton, two-wheel automotive trailer, locating it crosswise as suggested in the drawing on the preceding page. If the engine were set lengthwise, you'd find it a tough job to line up the belt, and even tougher to chock and brace the vehicle to keep it that way.

A Ford engine is excellent for crosswise mounting on a trailer because its length is short. A Chevrolet will also get under the line, although the pulley may stick beyond the trailer wheels a foot or so.

Cooling the engine. A stationary engine requires a different cooling system because you lose the car motion that forces air through the radiator.

Addition of an extra water reservoir, such as a 55-gallon steel drum, is a common solution. Water can be piped to and from the drum through the hot-water heater connections. Sometimes the radiator is eliminated and water from the engine block piped directly to a drum.

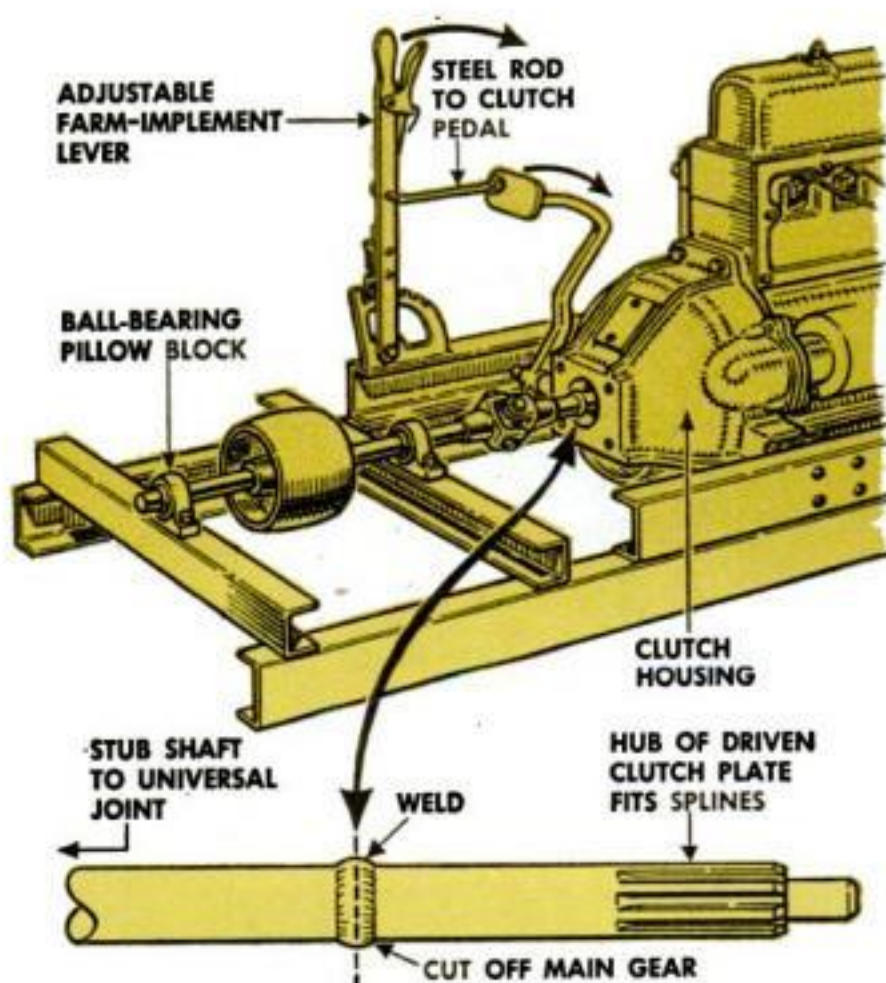
You might also substitute a larger radiator. For instance, a large truck radiator will do a good job cooling a Jeep or Model-A Ford engine. For larger engines, use a tractor or regular stationary-engine radiator. This, however, may cost you quite a bit.

Whatever radiator you use, you can improve its efficiency. Increasing the air flow by adding a large, multiblade fan is always a good bet. A smaller fan pulley will speed up the fan, pulling more air through the radiator.

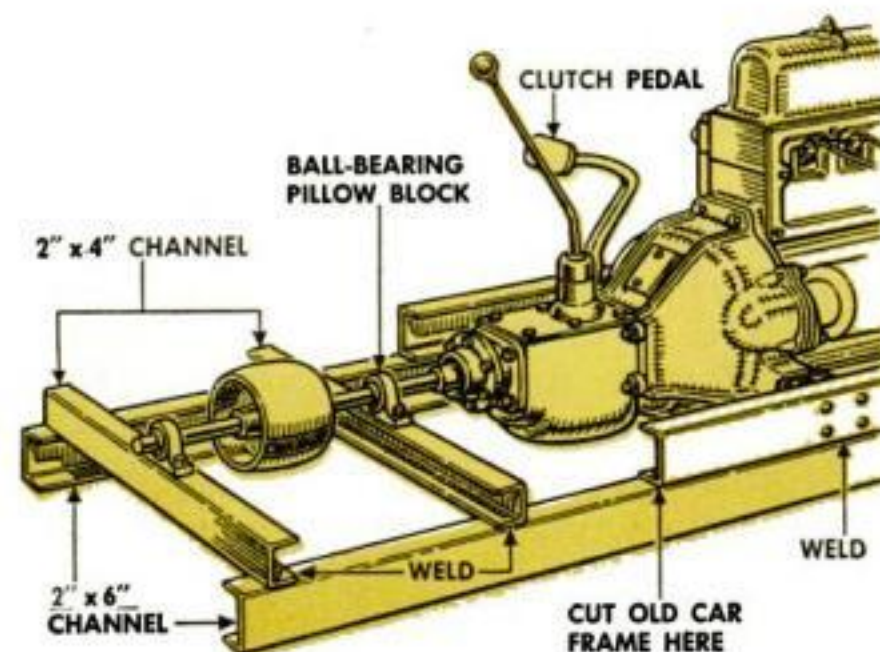
Most commercial power plants have a shroud over the back surface of the radiator. This causes the fan to pull air through the whole surface of the radiator at about the same speed, instead of leaving dead spots near the edges. A shroud is easily shaped from light sheet metal. Leave an opening a little larger than the fan and just in front of it.

Before you put your engine into use, be sure the cooling system is clean. Replace leaky gaskets and hose. Remove the thermostat. Your engine will warm up slowly, but the water will circulate more freely.

The power take-off. For this, it's easiest to leave the transmission in place. You might just fit a shaft to the universal joint, support the shaft with a bearing at



If transmission is worn or damaged, remove it and add a direct take-off pulley. To prevent vibration, shafts must be very carefully aligned.



A power take-off coupled to the transmission is more convenient. Several mail-order firms sell the parts required for such a take-off.

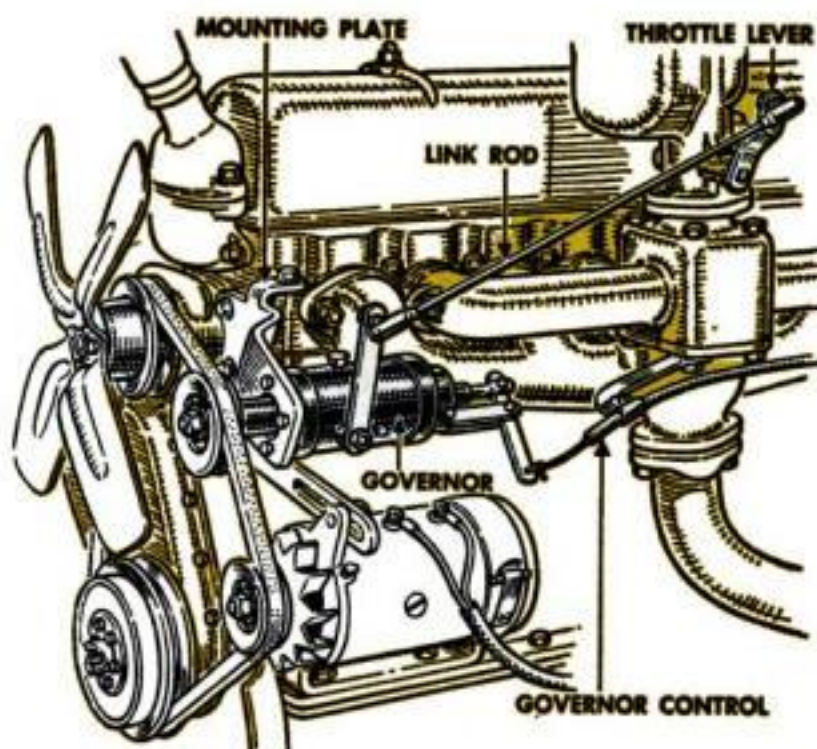
each end, put a pulley between, and the power take-off is complete.

You can often eliminate extra bearings and framing, however, by fastening the pulley shaft directly to the front half of the universal joint as shown in the two drawings in the opening pages. A take-off like this has the advantage of being clear of braces and framing, and it's easier to put the belt on the pulley.

If the transmission of the engine you are converting threatens to give trouble, remove it. Cut the main shaft close to the bearing in the body of the transmission. Weld a shaft 6" long and of equal diameter to the remaining stub, being careful to line them up. Insert the completed shaft through the clutch assembly as it was originally. Connect this to the pulley shaft by means of a universal joint. The two shafts must be carefully aligned with the crankshaft. Otherwise, you'll get excessive vibration.

Use the original clutch for your power take-off unless some special problem makes it impossible. The drawings suggest a couple of ways you can change the clutch pedal for hand operation.

Install a governor. You need this to maintain a steady flow of power and to keep the unloaded engine from racing. The fly-ball or centrifugal type is probably best. The vacuum type works fine if engine compression is good. With an old engine, though, you can never be sure of that, so the other is usually better. END



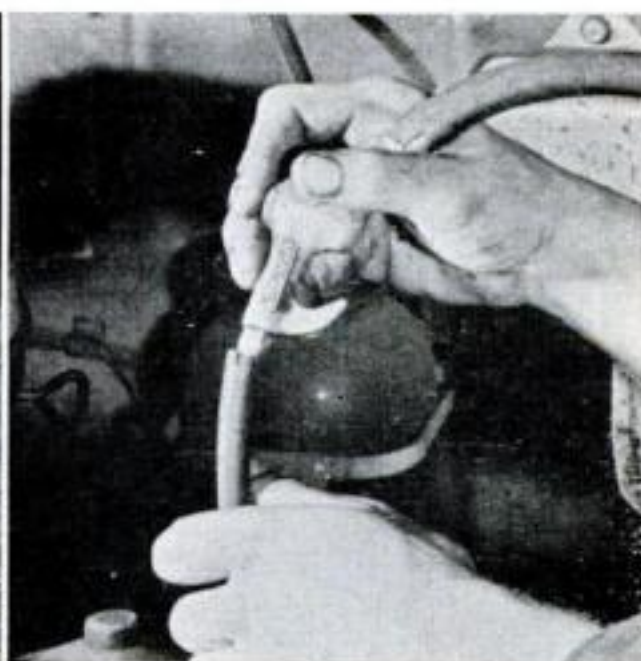
One way of installing a governor is suggested above. Specific instructions usually are included when you buy a governor. It's always advisable to use one on a stationary engine.

POINTS TO REMEMBER

When you build a power unit from a used automobile or truck engine:

1. Choose an engine to fit the horsepower requirements of the job it's to do.
2. Mount the engine securely.
3. Make provision for proper cooling.
4. Assemble an adequate power take-off.
5. Install a governor.

Oil Forced into Hose Speeds Up Sluggish Wipers



WHEN windshield wipers become sluggish, speed them up with rubber lubricant, the Ford Motor Company advises. Disconnect the hose, squirt in a little lubricant, and apply an air hose. Demonstrating the trick

above, a mechanic at Fordham Motor Sales, Bronx, N. Y., said a little No. 10 oil won't damage the hose—vacuum soon cleans it out. Another dodge is to oil the wiper intake and let the vacuum draw it in.

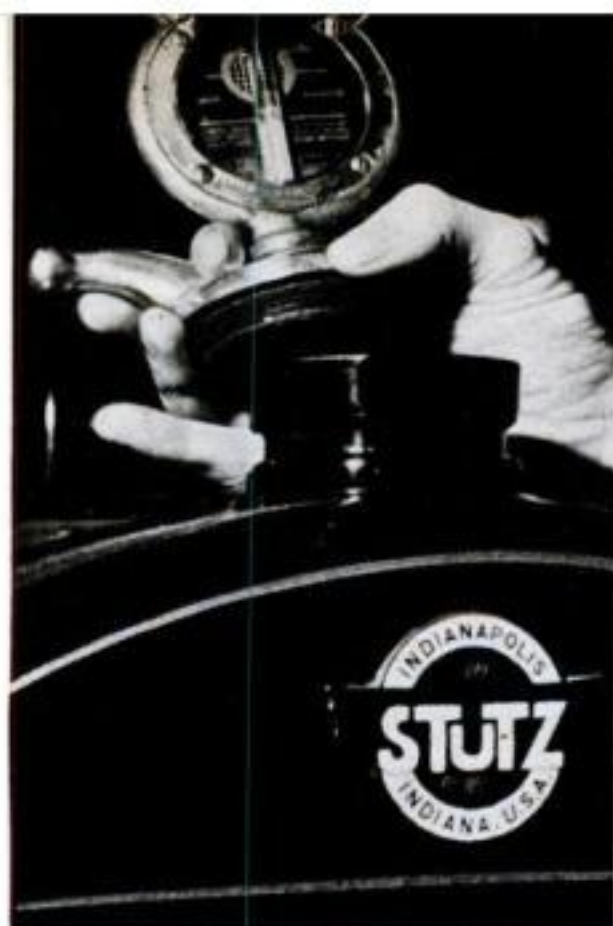
Look What They Used to Hang on Cars



Horses shied when early motorists tooted bulb horns like these. Elaborate affair in center plays four notes when you squeeze bulb once.

YOU can be happy your modern car has chrome trim—and not brass. Polishing grandpa's car was a time-eating job, and so was lighting its lamps. The driver had to stop, get out, and do it with matches. Putting up a "one-man" top usually required patience, luck, two men, and a dead calm.

But caring for auto accessories of bygone days is a labor of love at the Automotive Museum of Henry A. Clark in Southampton, Long Island. He collects lights, horns, radiator caps, window shades, bud vases, and other reminders of the auto industry's younger days. He is shown above with part of his display of lamps; the one he is holding is a self-generating gas headlight from a 1903 Peerless.



Motometer radiator cap showed engine temperature. It is seen above on a Stutz Bearcat.



Brass lamps in the museum need frequent polishing—just as they did on the old cars. Here Clark works on a side lamp from a 1911 Locomobile. This lamp burned kerosene.



Home, James! A telegraph device from English car enabled passenger to signal the chauffeur to start, stop, turn left or right.



Script nameplates once were all the rage. One above came from a 1910 Schacht motor buggy.



Speedometers were bought separately in the old days. The one indicated here cost \$65. It registered speeds up to 100 m.p.h.

Changing tires was a major job. Below, Clark prepares to remove the spare from a 1909 Mercedes. Note spotlight, side lamp, and horn.



In his workshop, Clark puts all his items in working condition. French gadget he's working on below generated acetylene for headlamps.



Why Auto Styles Have Changed

The science behind your low-slung, streamlined car is demonstrated in these simple home experiments.

By Kenneth M. Szezey

AUTO styles have changed as much as women's hats—but for entirely different reasons. The hats have merely followed fashion. The cars were changed to conform to natural laws.

Centuries ago, Archimedes observed that the stability of an object always increases as you lower its center of gravity—the point at which all parts of the object exactly balance each other.

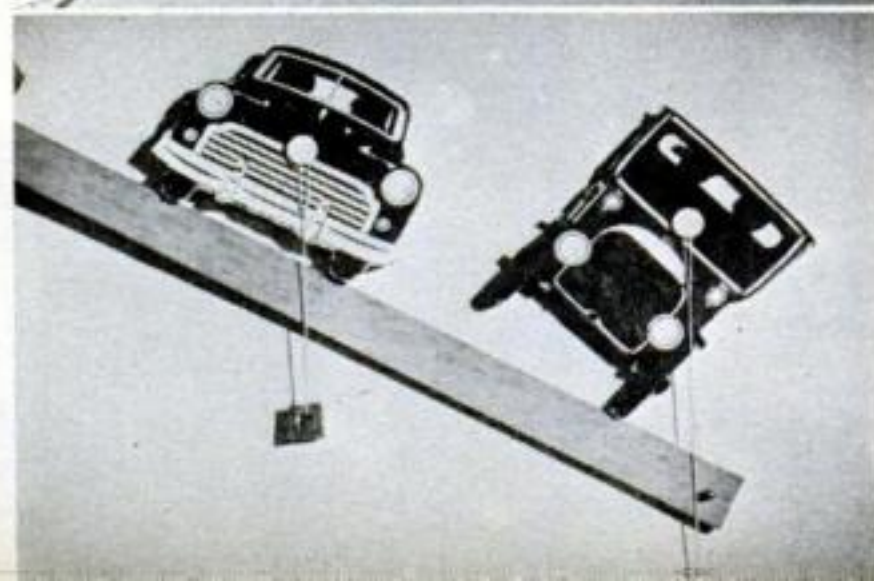
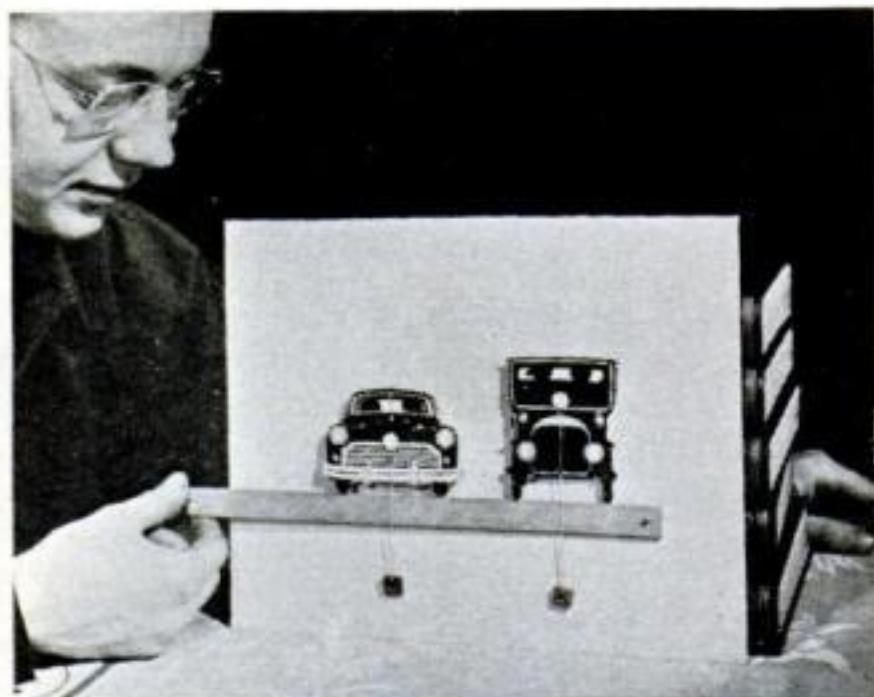
Automobile designers have made use of this knowledge in transforming car bodies from the high, boxlike affairs of 30 years ago to the lower, more streamlined products of today. As Archimedes could have predicted, lowering the center of gravity makes our cars less liable to tip over.



Designers have also taken into consideration the air's resistance to the motion of a car. It increases in proportion to the cube of the speed. This doesn't matter much at 30 or 40 m.p.h., but it becomes very important at 70 or 80. At the higher speeds, an old-fashioned square sedan might need 60 hp. just to buck air resistance. Modern streamlining cuts this power requirement considerably.

Strangely enough, the car makers have found that it's more important to streamline the rear of a car than its front. Turbulent air behind creates a partial vacuum that tends to slow the car.

These stunts show how center of gravity and streamlining apply to your car.



Center of Gravity. How this affects a car's stability can be demonstrated by gluing two car cutouts—one of modern design and the other of a high, old-fashioned type—to cardboard. Press a thumbtack into each, as shown, to indicate the center of gravity. Suspend a small weight from each tack. Stand the cutouts side-by-side on a stick pivoted at one end to a sheet of heavy cardboard. Tilt the cardboard back so the cars won't fall.

Now raise the free end of the stick and watch the threads that mark the line from the cars' center of gravity to the center of the earth. (It may be necessary to roughen the stick to keep the cars from sliding.) As long as a thread remains inside the car base, the car will stay upright. When it moves outside, the car will overturn. Consequently, you can see that a lowered center of gravity lowers the risk of a highway roll-over.



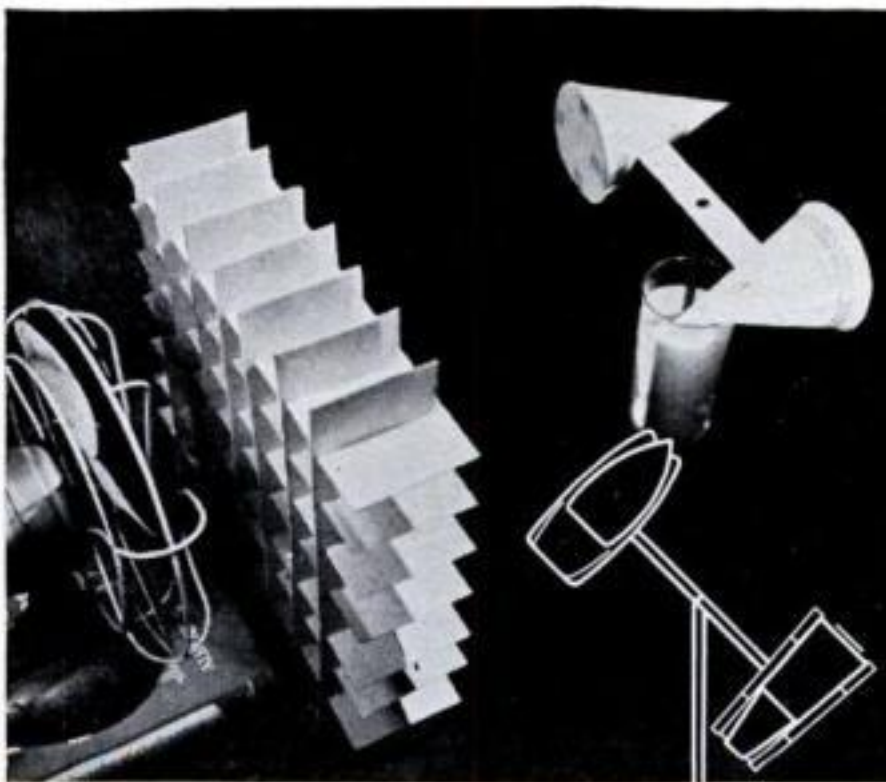
Streamlining Reduces Drag. To show this, make a right-angle bend near one end of a $\frac{3}{4}$ " by 3" cardboard strip and stand it an inch or so behind a square milk carton. Then blow against the opposite face of the carton. This represents an old square-backed car traveling toward you. As you blow, the cardboard will fall toward the carton—seemingly into the wind.

Now substitute a cylindrical can for the



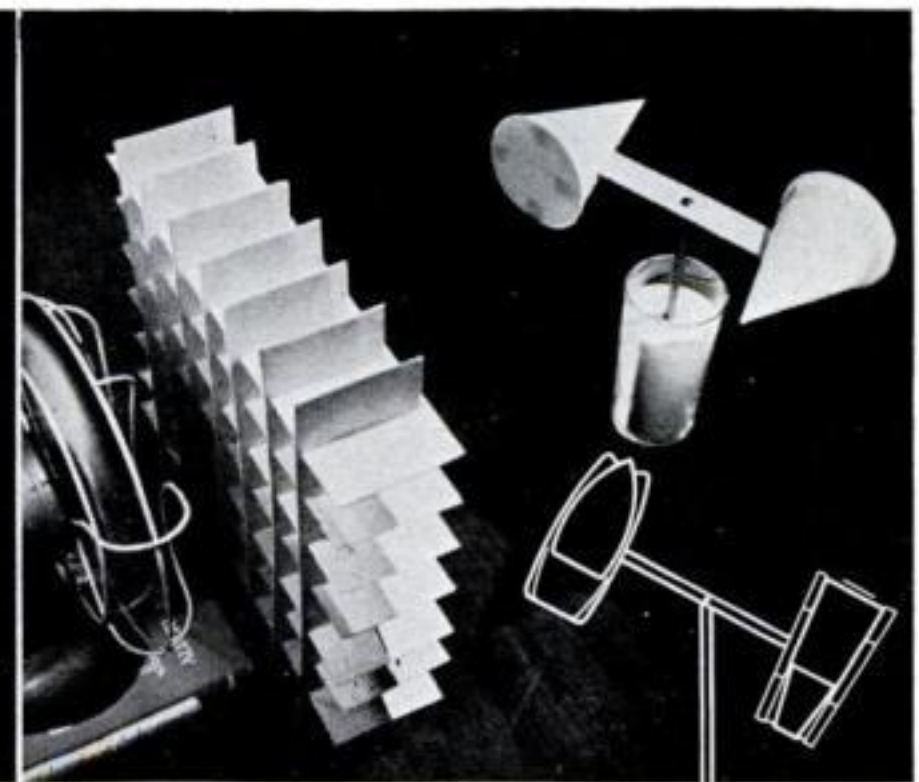
carton and repeat the stunt. The can represents a modern streamlined car. In this case, the cardboard will be blown along with the air stream.

When you blow against the carton, a partial vacuum is created behind it. In the same way, speed-reducing drag is produced behind a square-backed car. Around curved surfaces, however, air flows in a relatively undisturbed stream.



Rear or Front Streamlining? By arranging a tug-of-war between two conical paper cups, you can show that streamlining the rear of a car goes farther toward cutting down wind resistance than streamlining the front alone.

Tape a cardboard disk over each cup. Mount them in opposite directions on a stiff cardboard strip. Pivot this assembly at its center point. Point one cup toward a fan, the other away from it. Smooth the



breeze with strips of cardboard fitted together like an egg container.

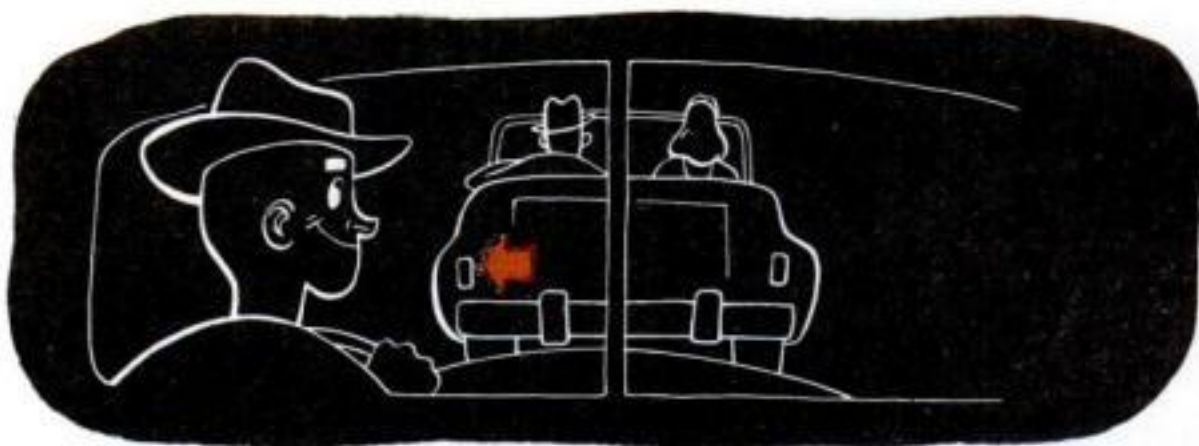
After the setup is arranged as at the left, turn on the fan. If your centering is accurate and the wind stream straight enough, the cup with its point toward the fan will be pushed back as above. The reason? A partial vacuum is produced by air turbulence behind the flat rear of the cup pointed into the breeze, forcing it back. Less turbulence results behind the other cup. **END**



Why confuse the other fellow with waving arms?

You Can Build a Turn Signal

Flashing lights will tell the world where you're going.



IF YOU can strip a wire, you can install a turn-signal system in your car. It's almost that easy—and the job will pay safety dividends every time you drive.

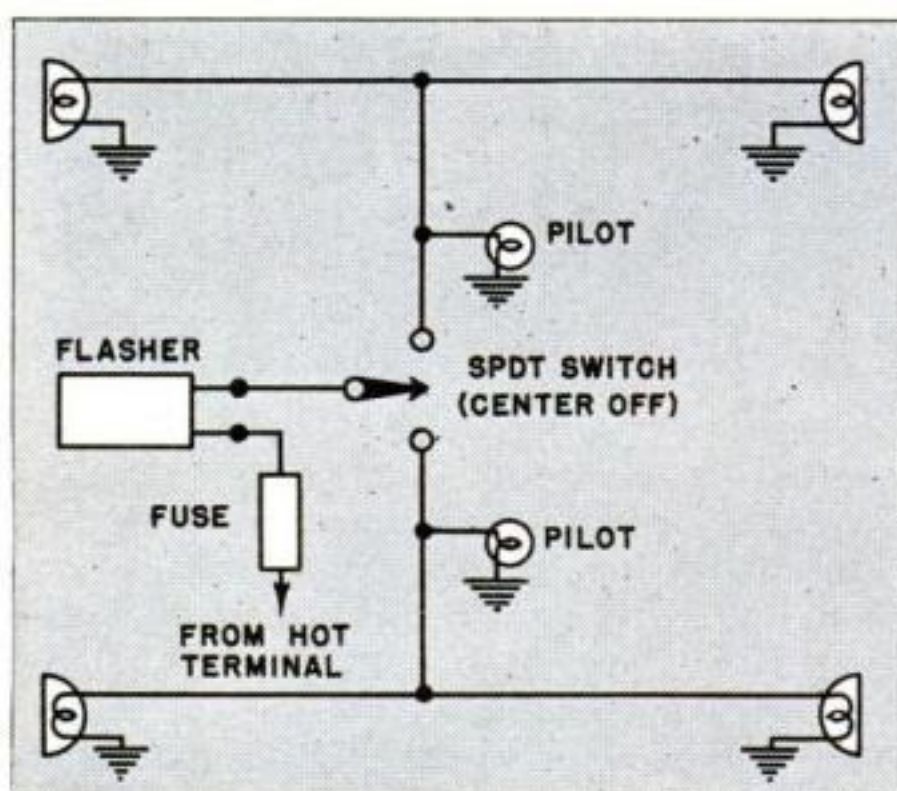
A flasher unit will be your biggest expense. You can get this at practically any auto parts store for around \$2.25. A switch, 16-gauge wire, and perhaps four double-contact sockets are other major parts.

Adding the necessary lights front and rear is the first step. At front, it's usually easiest to adapt the parking lights. If you seldom use them as parking lights, you can

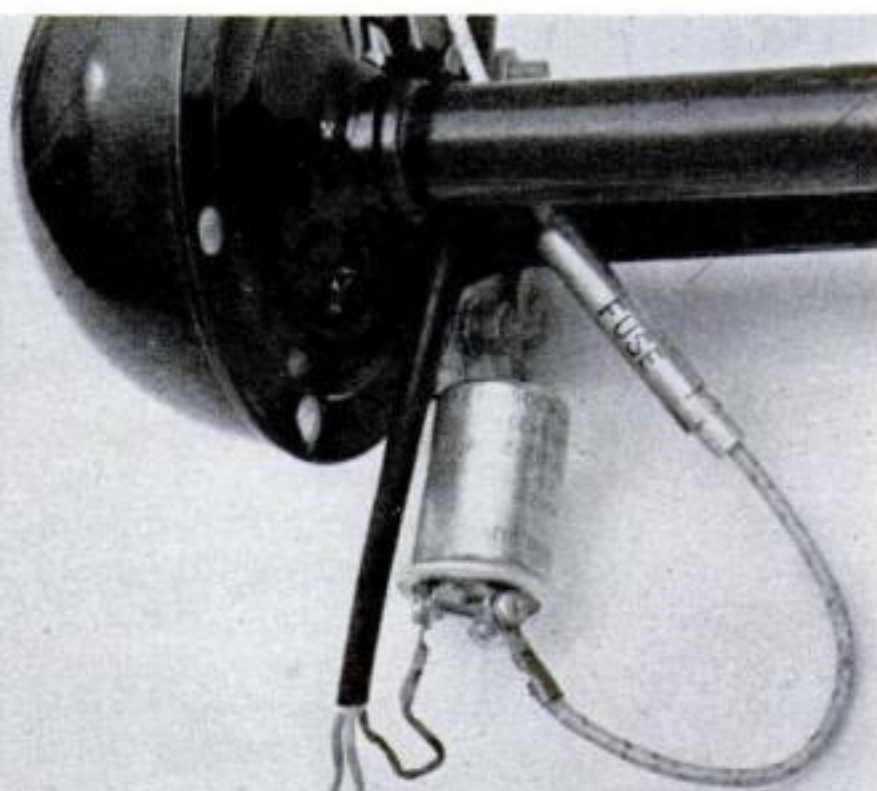
simply disconnect them, put in 21-candlepower bulbs, and connect them to your new blinker circuit.

It's better, however, to install double-contact sockets. Then you can use double-filament bulbs of 21-3 candlepower. This means that one filament will provide 21 candlepower (for signaling) and the other, 3 candlepower (for parking).

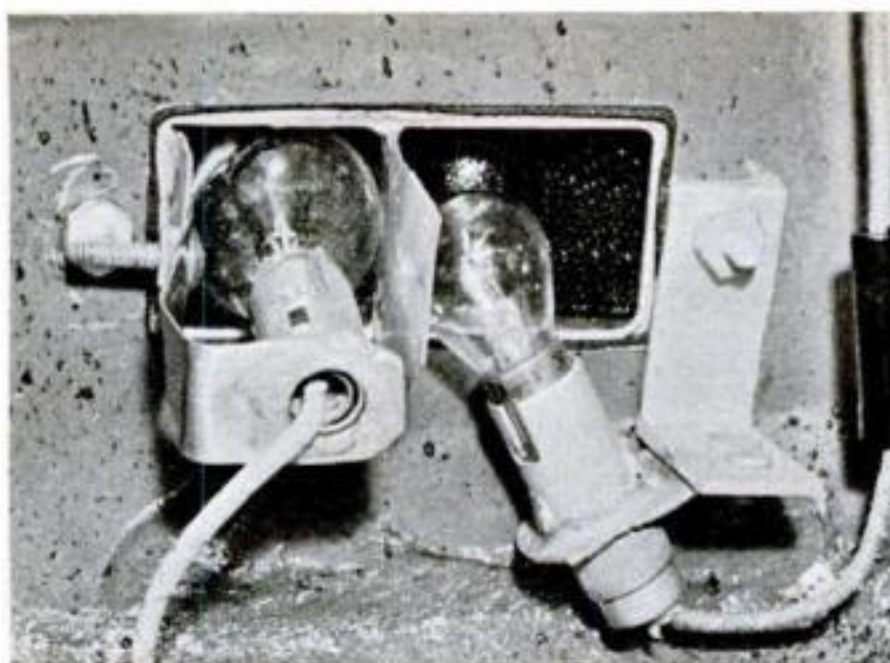
If your stop light is separate from your tail lights, convert the tail-light sockets to the double-contact type and install 21-3 candlepower bulbs. If the car has combi-



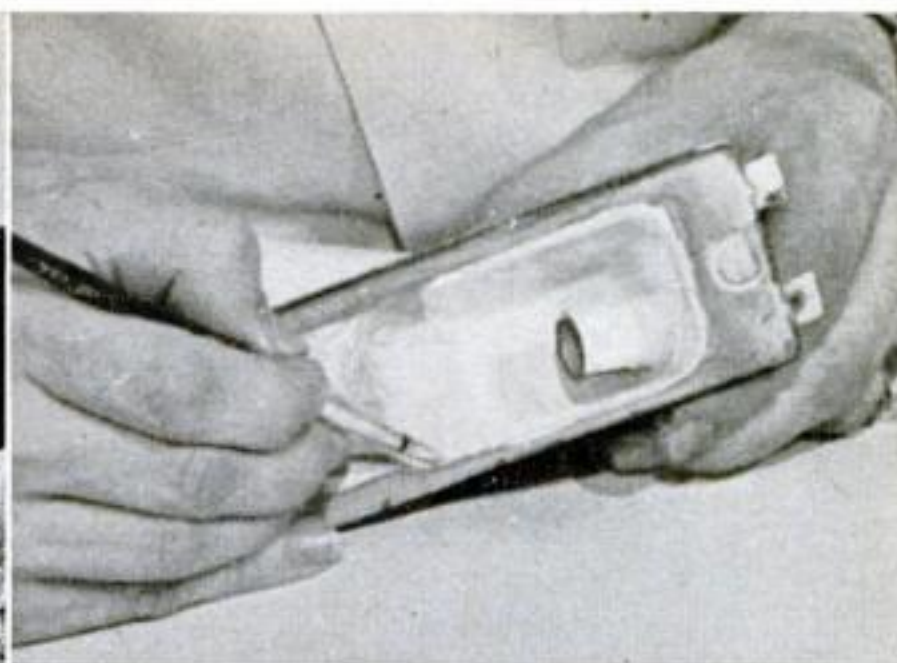
Wiring is simple. Note that you have circuit to each side of car. Unlike factory-installed units, turn lights must be turned off manually.



Flasher unit was mounted on horn bracket in this case. Three-conductor cable can be used between switch and flasher. Hot lead is fused.



A signal light can often be placed within the tail light by installing new brackets for the sockets. Solder a partition between the lights



to make the signal more noticeable. Painting the inside of the lamp housing with white enamel, as above, will increase light brilliance.

nation stop and tail lights, you must install separate signaling bulbs.

Rather than monkey with the existing lights, you may prefer to add a separate one at each corner of the car. You can buy these in painted or chrome shells. Mount them on the gravel shields or other spot where they will be clearly visible.

Locate the flasher unit somewhere in the engine compartment so its operating noise won't bother you. The switch can go on the dash or steering column.

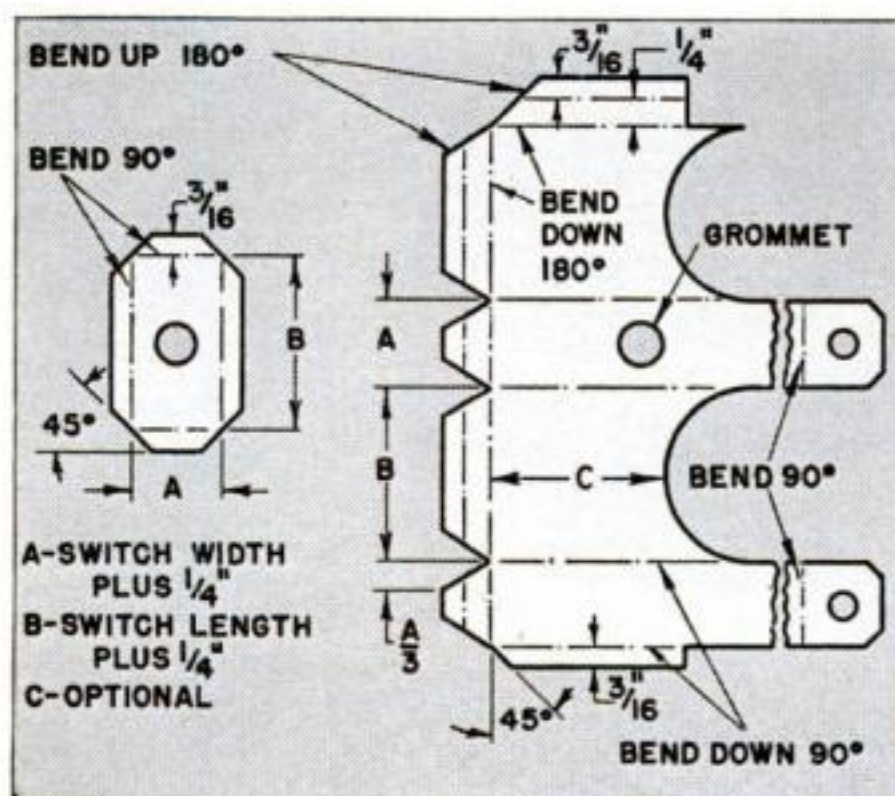
Connect your lights in a single-wire system, grounding one terminal. First connect the lights on each side, left front to left rear and right front to right rear. Tape the wire where it may be chafed.

A three-conductor, color-coded cable can

be used between the flasher unit and SPDT switch, which must be the center-off type. Connect one wire to the center post of the switch and one terminal of the flasher. Connect the other two to the remaining switch terminals. At the flasher unit, strip the coating from the cable and run the two wires that were connected to the outer switch terminals to opposite sides of the car, connecting them to the wires between the lights. From the flasher unit run another wire, through a fuse of 10 amperes or less, to a hot terminal. Then try the switch. If the lights work okay, solder all connections.

The pilot lights can be connected at the switch. If a single pilot will serve, connect it to the pilot terminal on the flash unit.

—R. B. MacArthur, Compton, Calif.



Switch housing can be laid out on light sheet metal as above. The size of your switch will determine dimensions A and B and to some extent C. Make the 180° up bends first, then



the 180° down bends. Next make the 90° horizontal down bends, including two not marked. Solder the joints. Install switch in housing and bolt clamp arms around steering column.



Gus Earns a Holiday

After a day of fishing, a good meal under his belt, Gus the Good Samaritan hears trouble knock. Since it's engine trouble, he finds a quick solution.

By Martin Bunn

KEN Littlefield moved into our neighborhood about six years ago. He and his wife, Joan, had bought the old Marvin farm 18 miles south of town on the west branch of the river, and had converted it into a comfortable country inn for summer vacationers. Whenever Ken came to town for provisions and supplies he always stopped by the Model Garage to fill up with gas and have a chat with the proprietor, Gus Wilson. He and Gus had built up quite a friendship, and the river beside Ken's little rambling hotel had become one of Gus' favorite fishing spots.

Three weeks ago, on one of those hot days we had early in June, Gus glanced up from an ignition job to see Ken's old but shiny station wagon pull up beside the pumps.

"Hi, Ken," Gus greeted. "Got your place in shape for the summer folks?"

"Just about, Gus," Ken answered, as he

unlocked the cap to his tank so Stan Hicks, Gus's assistant, could fill it up. "And not too soon either. Our first guests arrive in two weeks. But there's my big problem," he added, pointing over his shoulder.

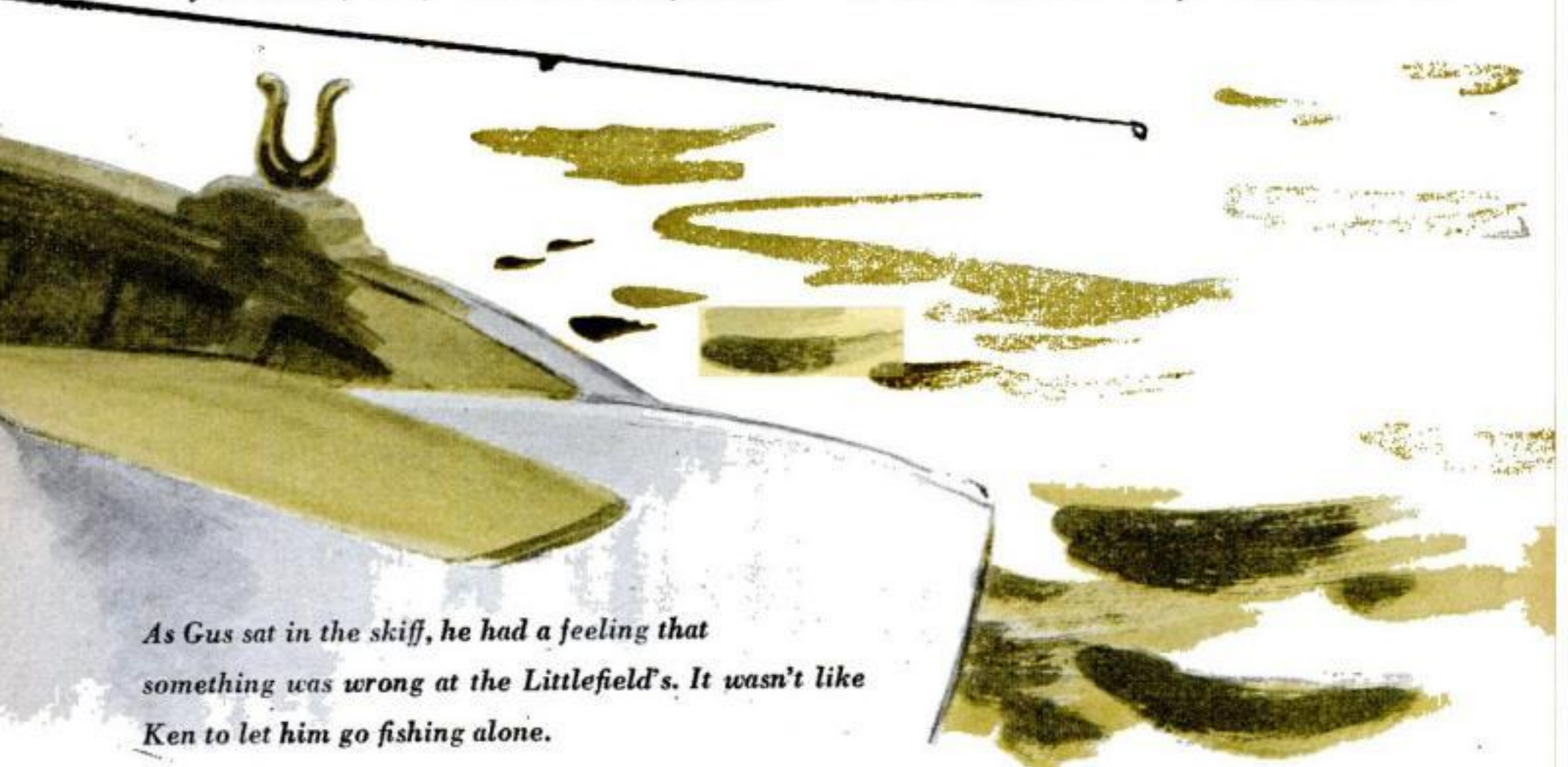
"I was wondering what you were doing with a spare motor in back," Gus said.

"It's a rebored and rebuilt engine for this old buggy. Only cost me \$142, plus shipping charges. Now all I've got to do is install it. I figure that with a block and tackle on the barn tie beam, I ought to be able to handle the job. Not that I'm trying to do you out of business, Gus, but this is a time of year when things are pretty tight with us." Gus's smile told him there was no need to worry on that score.

"By the way, Gus," Ken continued, as he paid Stan for the gas, "you haven't been out to the place since last Fall. How about coming out for some fishing one of these afternoons? Joan'll buy you dinner."

"I'll be out," Gus promised.

It was about ten days later when the



As Gus sat in the skiff, he had a feeling that something was wrong at the Littlefield's. It wasn't like Ken to let him go fishing alone.



fishing urge and the promise of a home-cooked meal made Gus decide to take up Ken's invitation.

As he drove along the road toward Millstown—that's the little crossroad hamlet a few miles from Ken's inn—Gus got to thinking about the Littlefields, and what nice people they were. They'd bought the Marvin place on a shoestring, and had done most of the remodelling themselves. Ken was a handy man with tools, and Joan was no slouch with pots and pans or needle and thread. Their first two years had been rough, but the place had caught on. Last summer, their ten rooms had been filled all season.

At this point in his reminiscing, Gus spied Ken's freshly painted sign—Settler's Inn—and turned into the private lane that led to the main house.

"Well, if it isn't Mr. Wilson," Joan greeted him as he maneuvered his car into a parking spot. "I'd almost given up hope of seeing you before we opened."

Ken's Not at Home

Joan hadn't changed a bit in the eight or ten months since Gus had seen her last. Hard work seemed to agree with her.

"Ken isn't here right now," Joan apologized as they climbed the steps to the broad veranda that rimmed the house. "Why don't we just sit here on the porch until he gets back, and you can catch me up on all the gossip."

Gus had just finished telling her about old pinchpenny Barnstable's recent brush with the law when he recognized the Littlefield sedan turning into the lane. Ken had someone with him.

"Here's Ken—and that's his young brother Dave with him," Joan explained. "Dave wants to go into the hotel business when he gets out of college. He's going to work for board and keep for the summer—sort of on-the-job training. It's a break for us."

Ken waved a greeting as he opened the porch door and spied Gus.

"Gus, this is Dave—he's my kid brother."

"Glad to know you, Dave." Gus shook the young man's hand. "Well, Ken, I've taken up your invitation."

"Good," said Ken, "but I'm afraid you'll have to fish alone. Dave and I've a job to do. You know where the skiff's tied up, and the bass and pickerel are running strong."

What's Up at Settler's Inn?

As Gus sat in the skiff, rod in hand, he had a feeling that something was wrong at Settler's Inn. Ken had looked worried and tired, and it wasn't like him to let Gus go fishing alone.

Two hours and three small-mouth bass later, Gus decided he'd better head back to the **Littlefields**. He wanted to get back in time to clean his fish, wash up, and be ready for Joan's dinner.

The dinner was one of Joan's usual—chicken and dumplings with lots of thick, creamy gravy, hot homemade bread, strawberry shortcake made with biscuits, and the kind of strong coffee that Gus liked but seldom got in restaurants. Gus was enjoying every mouthful of it when he noticed that neither Ken nor his brother were eating much. He suddenly realized that most of the conversation had been between himself and Joan.

"What's the matter, Ken?" Gus asked. "Something bothering you?"

"Oh, nothing in particular," Ken replied without looking up from his plate.

"Anything I can help you with?" Gus offered.

"No, Gus. It's nothing. It'll work out."

"Now look here, Ken Littlefield," Joan admonished. "You know right well it's something Gus could help you with, and I think you're just being downright childish not to tell him about it. You've been acting like a bump on a log all afternoon, and if you don't tell him, I will."

"Well, there is something," Ken finally admitted. "But I don't want you to think I asked you out here just to—"

"Nonsense, Ken. Let's have it."

"It all goes back to the last time I stopped

by the Model Garage," Ken began. "Remember, that rebuilt engine I had in the back of the station wagon?"

Gus nodded.

"Well, after Dave got here last weekend we spent all our spare time taking out the old engine and getting the re-built job into place. Everything went fine until we stepped on the starter. She ticked right off. But when I idled her back there was a bad knock. After checking everything this afternoon we've decided they shipped us an engine with a bum main bearing. At least that's what it sounds like. About all we can do now is rip it out again, send it back, and wait for a replacement. That means we'll be hamstrung with nothing but the sedan and paying guests due any day."

"Whoa, Ken, maybe things aren't so black," put in Gus. "Mind if I try my ear on this knock of yours?"

Two minutes later, the three men were in the barn.

"There's my headache," Ken indicated, switching on the lights.

As Dave started the engine, Gus stood beside the open hood and listened. The knock was there all right. No doubt about it. Gus reached in and moved the throttle rod to the carburetor back and forth. The noise was just as noticeable at all speeds.

"Doesn't sound so good," Gus admitted. "Got a screwdriver handy?"

Ken handed him a long screwdriver from a nearby bench and Gus used the metal shank to short out one spark plug after another. It had little effect on the noise.

The rebuilt installation didn't include a new head or manifolds, but Gus had worked

Car Gets Station-Wagon Look



Old cars get a new look with these wood body panels designed to give the appearance of one of those special body jobs. Easily attached by screws over the existing body, the panels are made of mahogany and hardwood veneers and come to fit all makes of cars since 1927. The Bellbod Co., of Brooklyn, N. Y., sells 2-door kits for \$175.

on Ken's station wagon before and didn't think anything was wrong there. Then he had an idea.

"Have you had that old head off since you first installed it?" Gus asked.

Ken shook his head.

"Let's take it off and have a look at the rebore job," Gus suggested. "You'll have to take it off anyway if you decide to send the motor back."

Ken agreed, and he and Gus set to work. When they had the head off, Gus ran a finger around the inner walls of a cylinder.

"A nice job," he said. "New valves as well as new pistons."

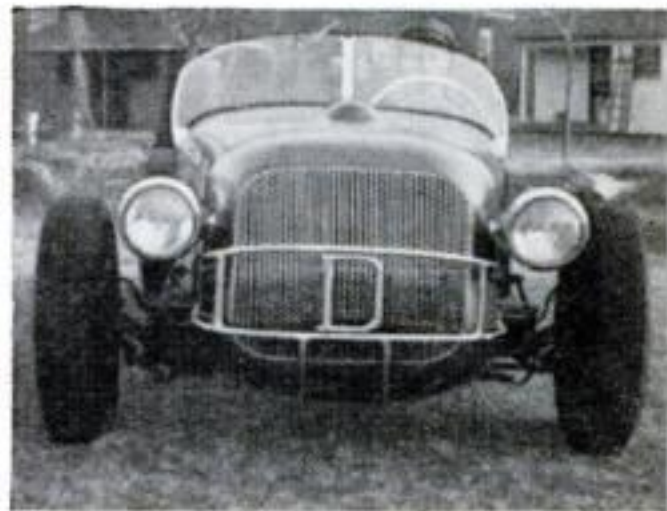
For a moment Gus studied the top of the

[\[Please turn to page 226\]](#)

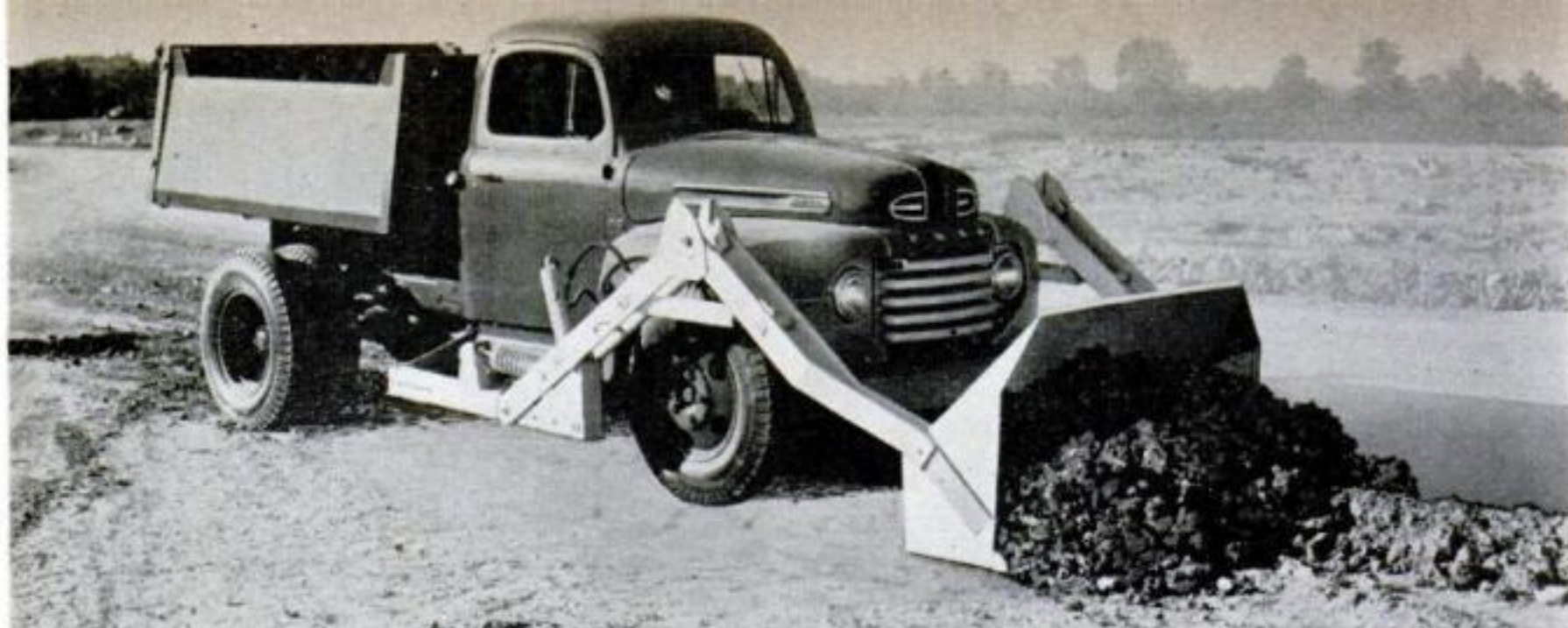
Father-and-Son Team Builds Homemade Roadster



THIS snappy homemade roadster, built by R. E. Daniels and his father, of Wichita, Kans., boasts a distinctive body formed entirely of new sheet steel. Grille, windshield bracket, and front bumper were fabricated



in the father-and-son machine shop and then chrome-plated. Engine is a stock '48 Mercury, except for an Edelbrock Super manifold. Transmission is Ford with '48 Lincoln gears and a two-speed rear axle.



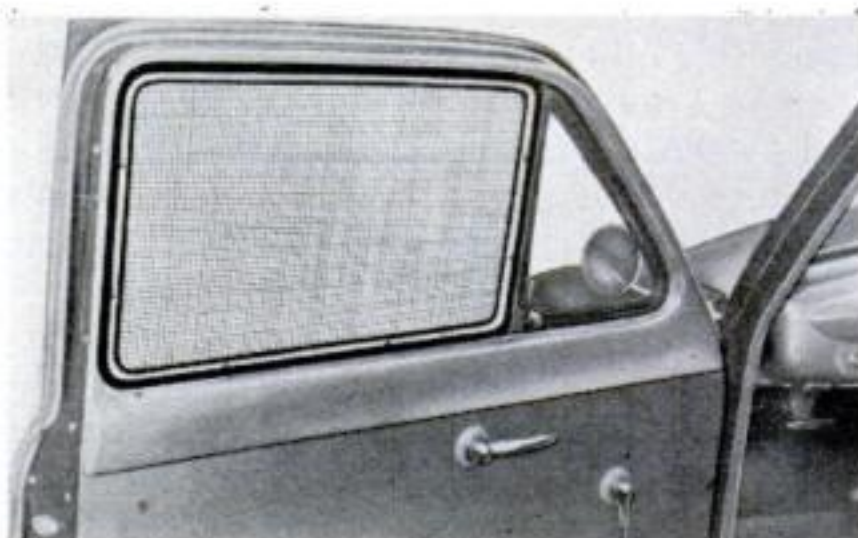
Dump Truck Is Self-Loading

WITH the hydraulically operated bucket shown above, loading a dump truck becomes a one-man operation. The loader scoops up material and delivers it to the truck bed over the cab top. The operator can even do light digging or grading. Shown at left in vertical position for dumping or driving, the attachment, made by the Ernest Holmes Co., of Chattanooga, Tenn., can be installed on most standard trucks.



New Auto Screen Foils Insects

THE Auto-Screen in photo at right permits the outdoorsman to take a nap in his car with plenty of ventilation but without annoyance from insects. Designed to fit any car window, the screen consists of a strong mesh netting encircled by a light spring steel frame. The frame adapts itself to a window's shape; a take-up device lengthens or shortens it. The screen is made by the Mocar Products Co., of Dearborn, Mich.



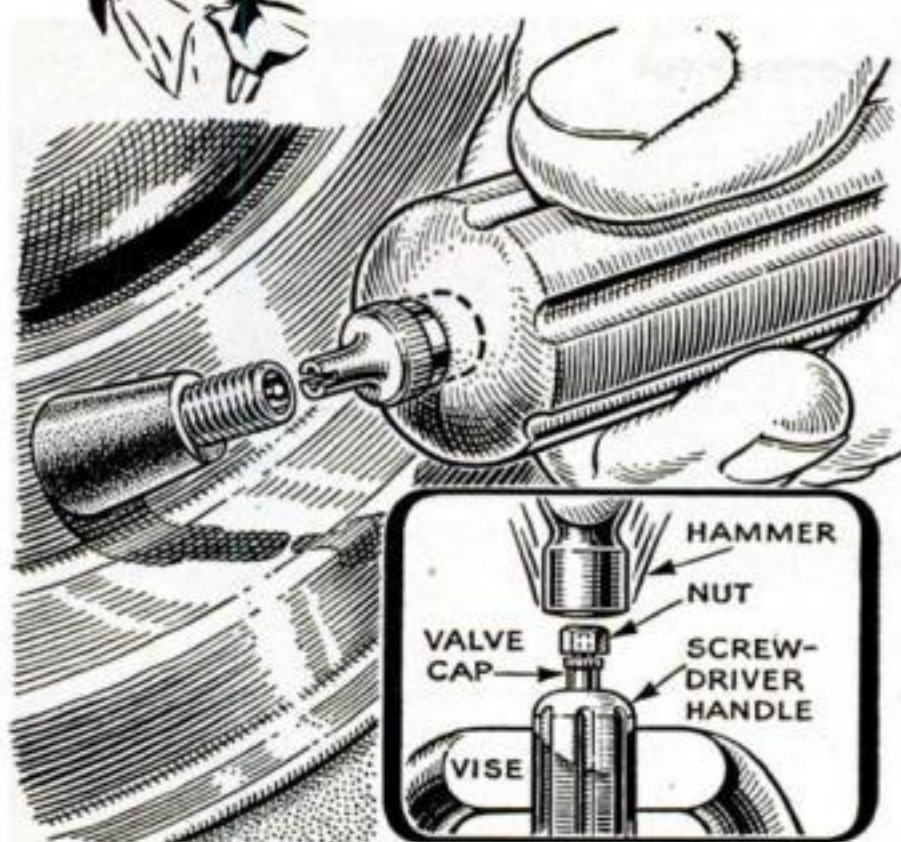
Gas Pump Is Silent Salesman

A LIGHTED sales message moves continuously across the top of a new gas pump, as shown in photo sequence above. Simulating the illuminated news bulletins that travel

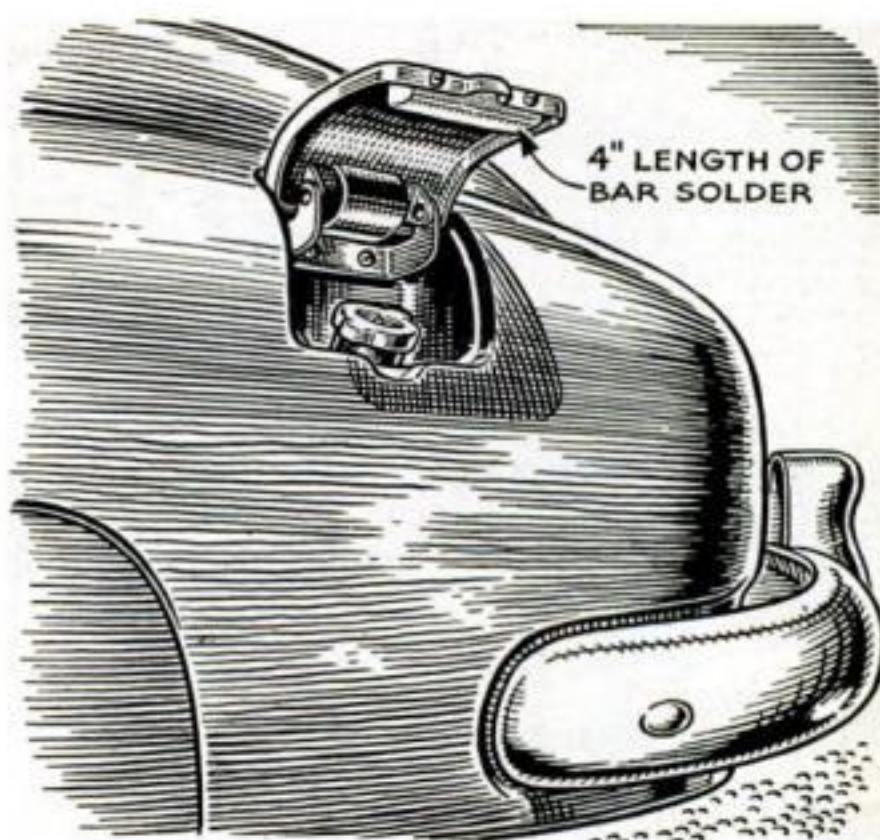
around a building in New York's Times Square, the device repeats its 55-character message five times a minute. The ads are carried on an endless, plastic-impregnated fabric tape. Gilbert & Barker Mfg. Co., West Springfield, Mass., makes Sell-A-Vision.



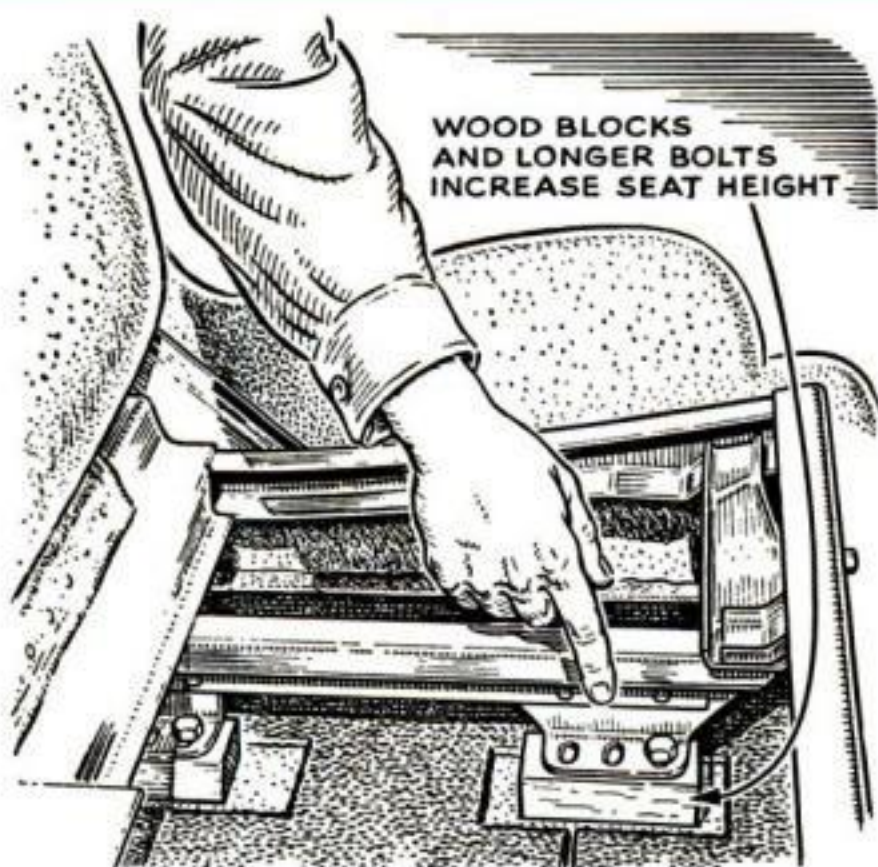
Hints from the Model Garage



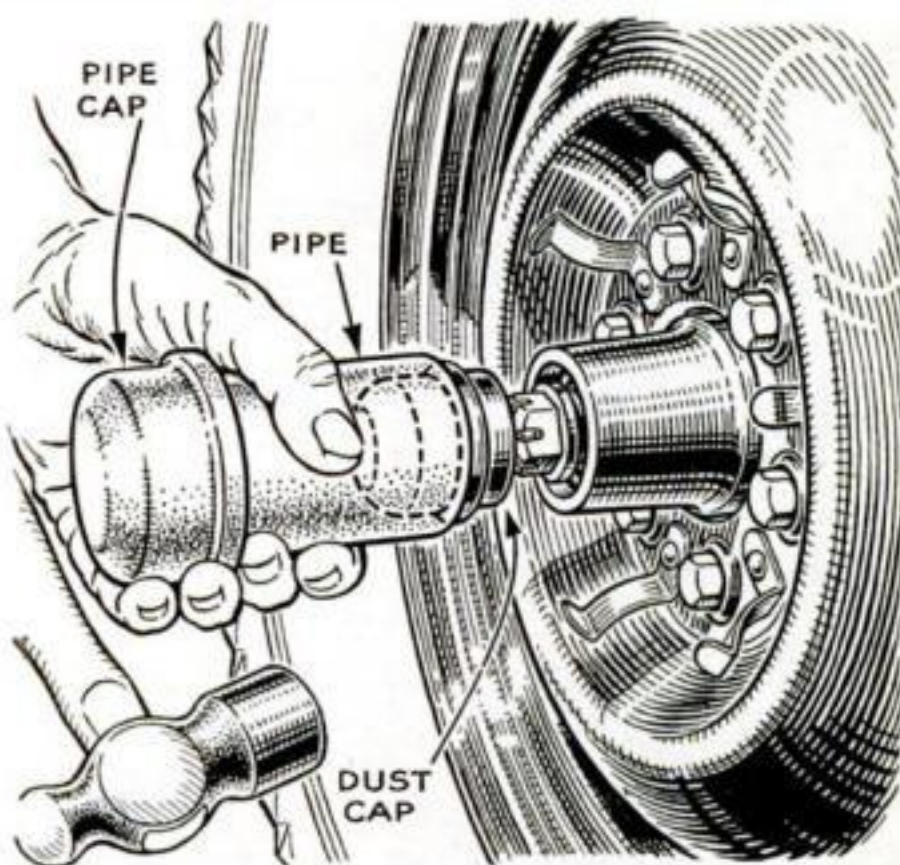
Keeping Valve Cap. A valve cap embedded in a wooden screwdriver handle keeps it handy in your tire-repair kit. Holding the screwdriver in a vise, slip a protective nut over the valve-tool end of the cap and drive it into the wood.



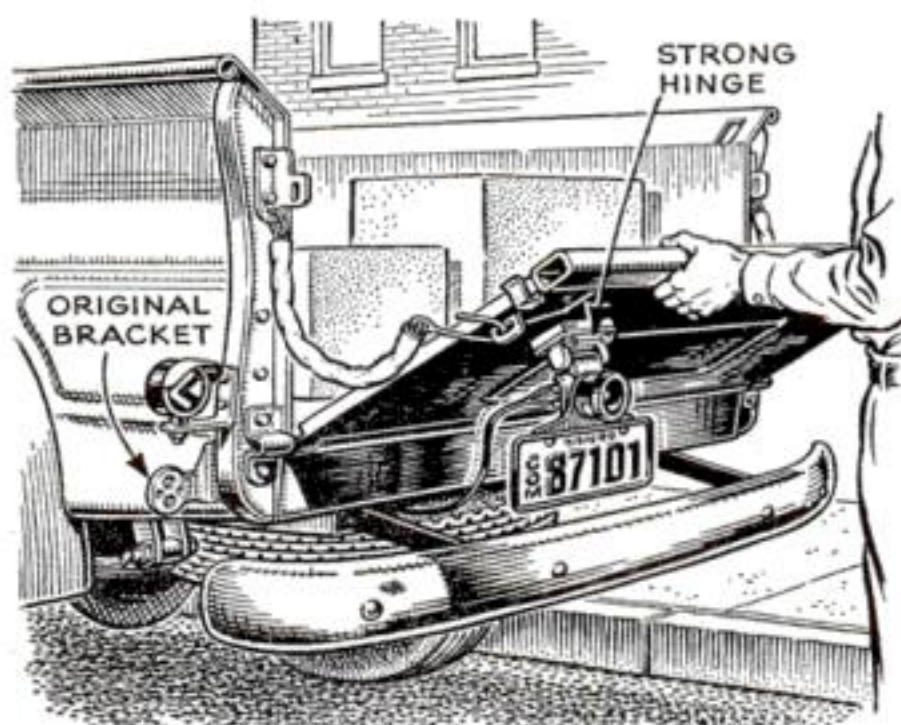
Weight Keeps Cover Closed. Gusts of wind swirling under the fender at high speeds sometimes blow the gas-filler door open, especially if the spring is weak. Weighting the lower door edge with a screwed-on piece of bar solder holds it shut.



Blocks Raise Low Seat. In certain new cars, the front seat is so low that some drivers have difficulty seeing over the hood. John H. Brichetto, of Knoxville, Tenn., solved the problem in his car by installing a wood block 2" thick under each corner of the seat rails. The new bolts must, of course, be longer than the original ones.



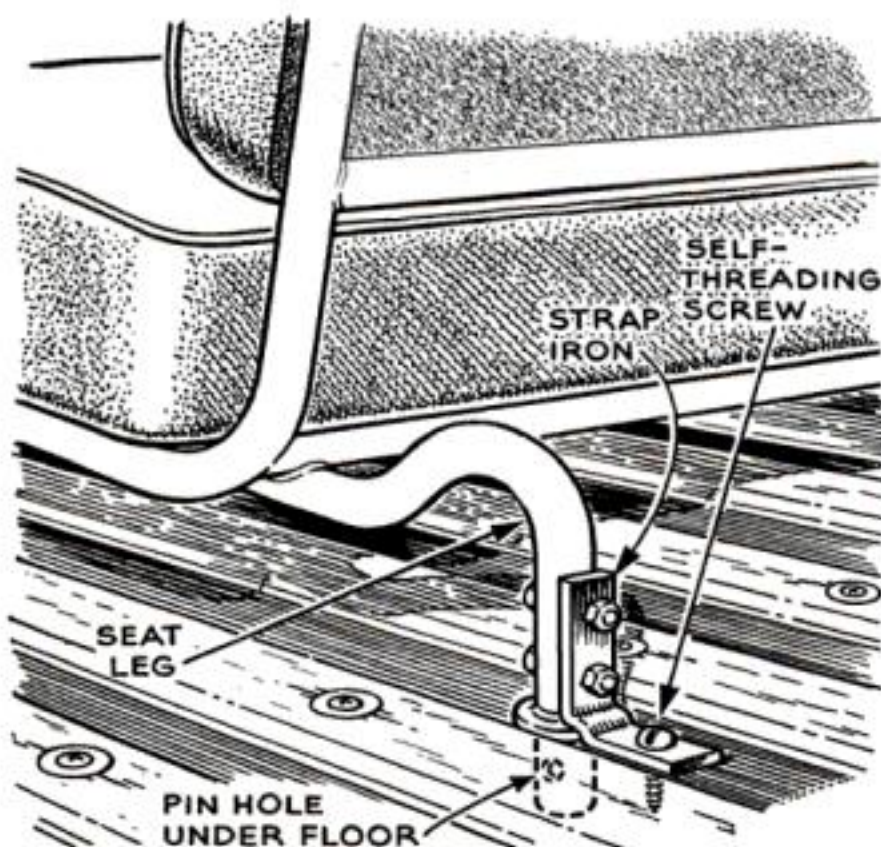
Tool Puts Dust Cap in Place. A piece of 4" pipe makes an ideal tool for returning the dust cap to position after you've packed the front wheel bearings. Thread one end of the pipe and cap it. Rest the pipe on the flange and tap gently until the dust cap seats. Using a hammer directly is apt to damage the dust cap.



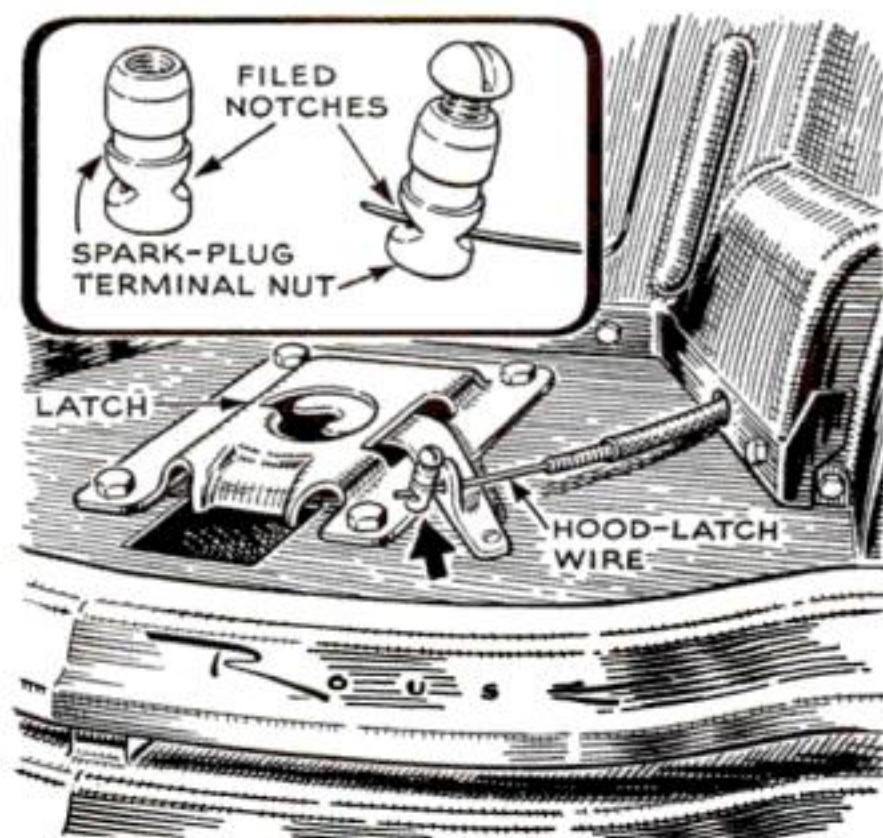
License Hinges on Tail Gate. On a pickup bought by the Modern Air Conditioning & Refrigeration Service, of Long Island City, N. Y., it was discovered that lowering the tail gate partially obstructed the tail light and license plate. A company mechanic solved the problem by mounting a hinge on the tail gate and bolting the light and license bracket to the hinge. This keeps light and license in full view.



Ready for a Good Deed. Driving a new car, you may tend to pass by motorists in need of a push because your shiny bumpers might get marred. John Calder, of Laurel, Md., prepared for this by cutting two 12" lengths from a tire, trimming out the bead, and threading in a loop of wire. By hanging these on the bumper guards he can give (or receive) a push without damage to either vehicle.



Removing Station-Wagon Seat. To remove the middle seat from recent Ford station wagons, you must crawl under the vehicle and pull out a couple of pins. To make the job easier, Marion L. Rhodes, of Knightstown, Ind., bolted a strap-iron bracket to each seat leg as shown. Removing the screws frees the seat.



Repairing Hood Release. If the fitting gets lost from the end of a hood-release cable, James McElroy, of Kent, Ohio, suggests this fix. File notches in opposite sides of a spark-plug nut, pass the wire through, and clamp it with a small screw. The same idea might be used for choke and throttle controls.

This Table Cost Only \$6.50

... because it was made out
of breadboards and ax handles

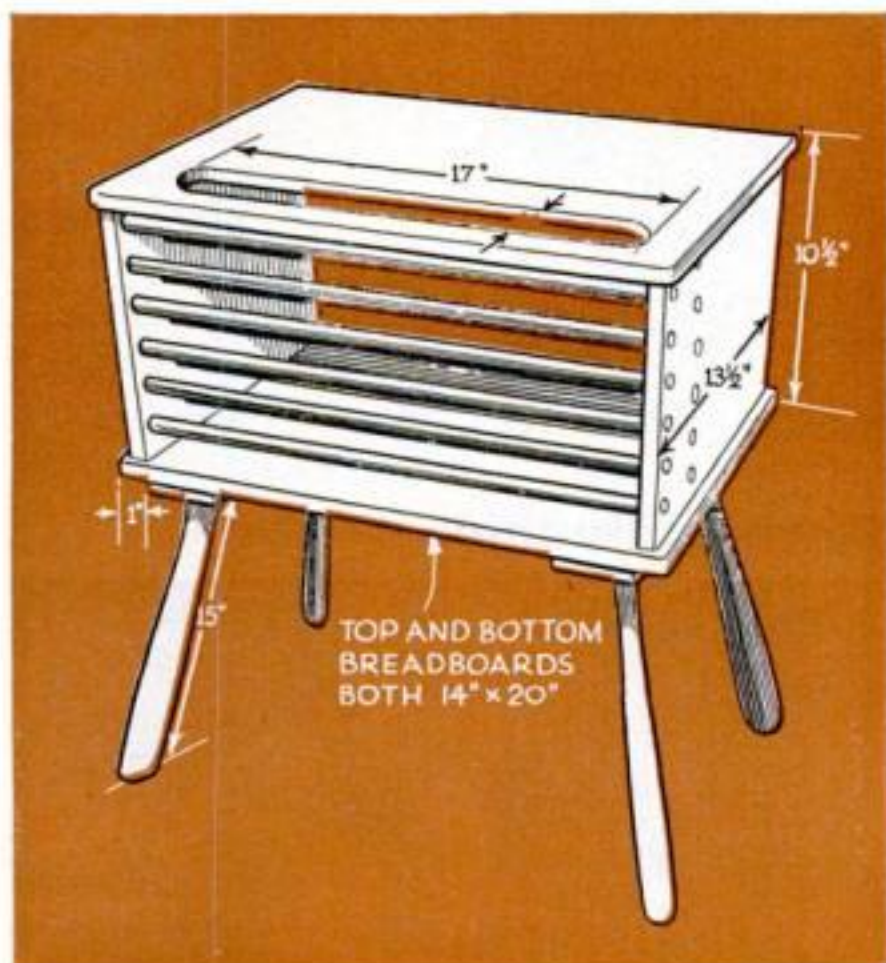


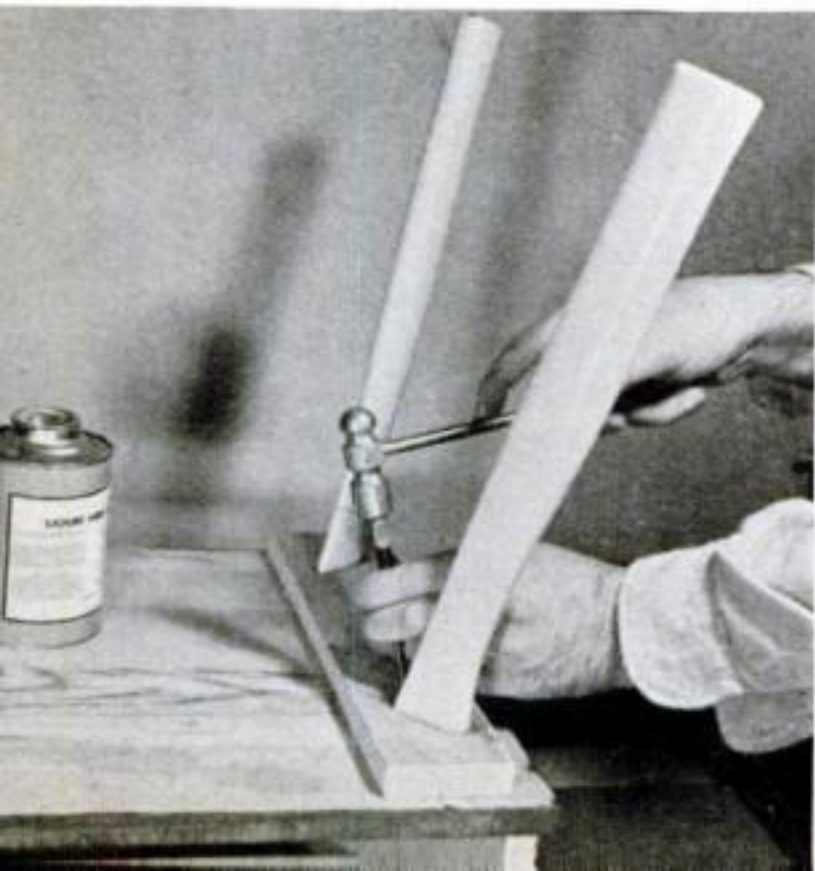
Table has space for books in front; magazines through slot at rear. You can also put a plant or small radio in book space and a lamp on top.

WIDE pieces of wood for small home projects are expensive and often hard to find—unless you look in a dime store. That's where I bought the two 14" by 20" breadboards that make the top and bottom of this table. Another breadboard was cut up to form the sides. With the exception of the two 3" by 13" cleats, all dimensions are on the drawing above.

Drill and file holes in the cleats to take

the ax-handle legs. The legs are held by nails and glue. One photo shows a way to set the legs so they'll be level. If the slots you cut for the legs are too big in spots, fill the spaces with glue and composition wood.

The dowels at the rear of the table should be cut a little short. Then the ends can be covered with composition wood before sanding and staining. You should also stain the dowels before putting them in place.



After top section is assembled, cleats are nailed and glued to base as shown at left. Photo at right shows how to adjust legs. Nail and glue two legs to one cleat. Tie cleats together and put level on top. Then adjust the two un-nailed legs until bubble is in dead center. Then nail and glue them to the second cleat.

JULY 1950 177





Tree Stumps Support Table

You can duplicate the sturdy picnic table and bench pictured at left by cutting down a couple of small trees in your yard or wood lot. The trees should be about five or six feet apart. Cut them so they'll be the right height for the table. Then use spikes to nail the planks and angle supports together. Upended concrete blocks support the benches.

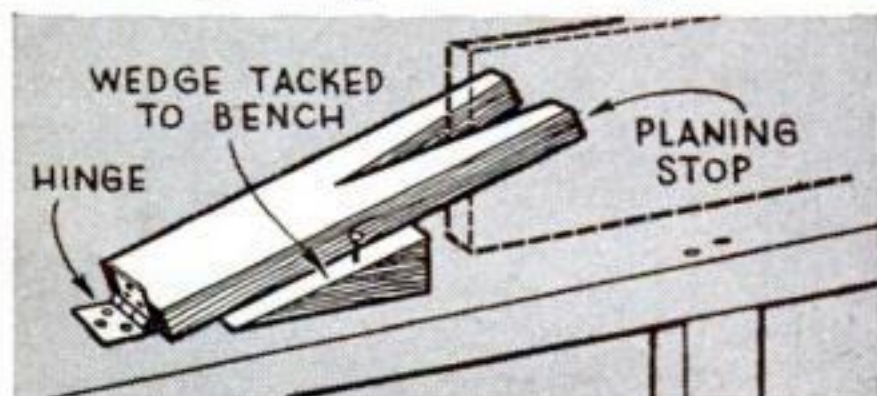
Disk Heated to Apply Glue



STICK-TYPE adhesive often is applied to a sanding disk by friction heat with the sander running. I had difficulty spreading the adhesive evenly, stopping the wheel, and placing the sandpaper before the glue chilled. Now I warm the disk

over a stove, rub on glue, and place sandpaper on the disk. To clamp the paper and disk together while the glue is cooling, I place the disk paper-side-down on the drill-press table and lock the chuck down on it. —E. F. Lindsley, North Prairie, Wis.

Planing Stop Made Adjustable



TO MAKE a planing stop that's adjustable to boards of different width, notch a piece of lumber and hinge it to your workbench as shown above. Use a wedge cut from a two-by-four to hold the stop at the desired height. —Victor H. Lamoy, Upper Jay, N. Y.

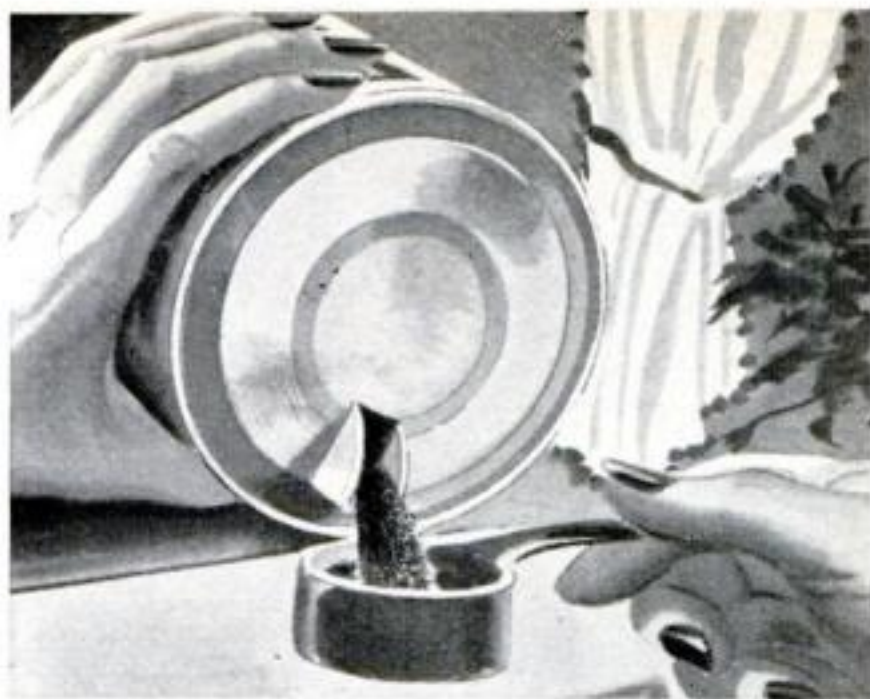
Barrow Doubles as Stove



IN A PINCH, a steel-bodied wheelbarrow serves as a fine outdoor grill for back-yard picnics. Put the legs on a plank so the sides are level. Then bridge the top with an old oven or refrigerator shelf. A few boards, cleated together and mounted so they rest evenly across the wheelbarrow handles, make a handy work space. Kindle a fire in the body, add charcoal, and you're ready to cook. —Ken Wright, Chappaqua, N. Y.

I'd like to see them make...

Everyone has his own pet idea of some gadget he would like to see in general use. What is YOURS? Popular Science will pay \$5.00 for each one published. Use government postcards only. Contributions cannot be acknowledged or returned.



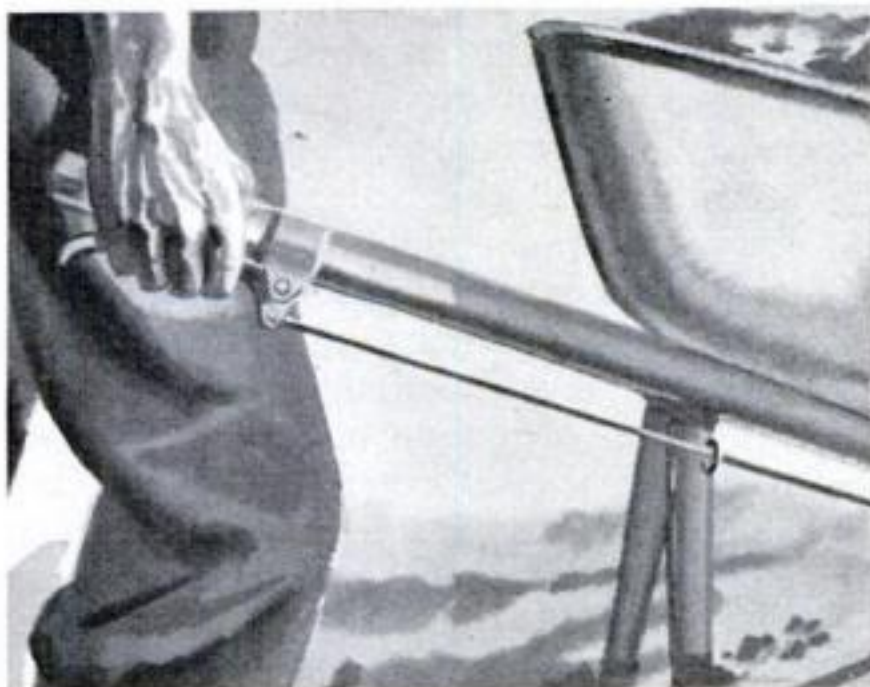
Coffee cans with pouring spouts. A vacuum-sealed pop-up spout built into the top of the can would make it easy to measure coffee. It would also eliminate handling of the sharp-edged lid.—Mrs. J. Stanley, Bloomington, Ind.



Plastic shoe coatings. If you could paint a hard, flexible plastic finish on new shoes, you'd be able to shine 'em up with a damp cloth. The coating could be colored or transparent.—Mrs. George H. Smart, Cleveland, Ohio.



A double-ended pipe wrench. You need both a Stillson and an adjustable wrench when working on pipes and fittings. Having both on one handle would lighten your tool bag.—Clarence Haeg, Plummer, Idaho.

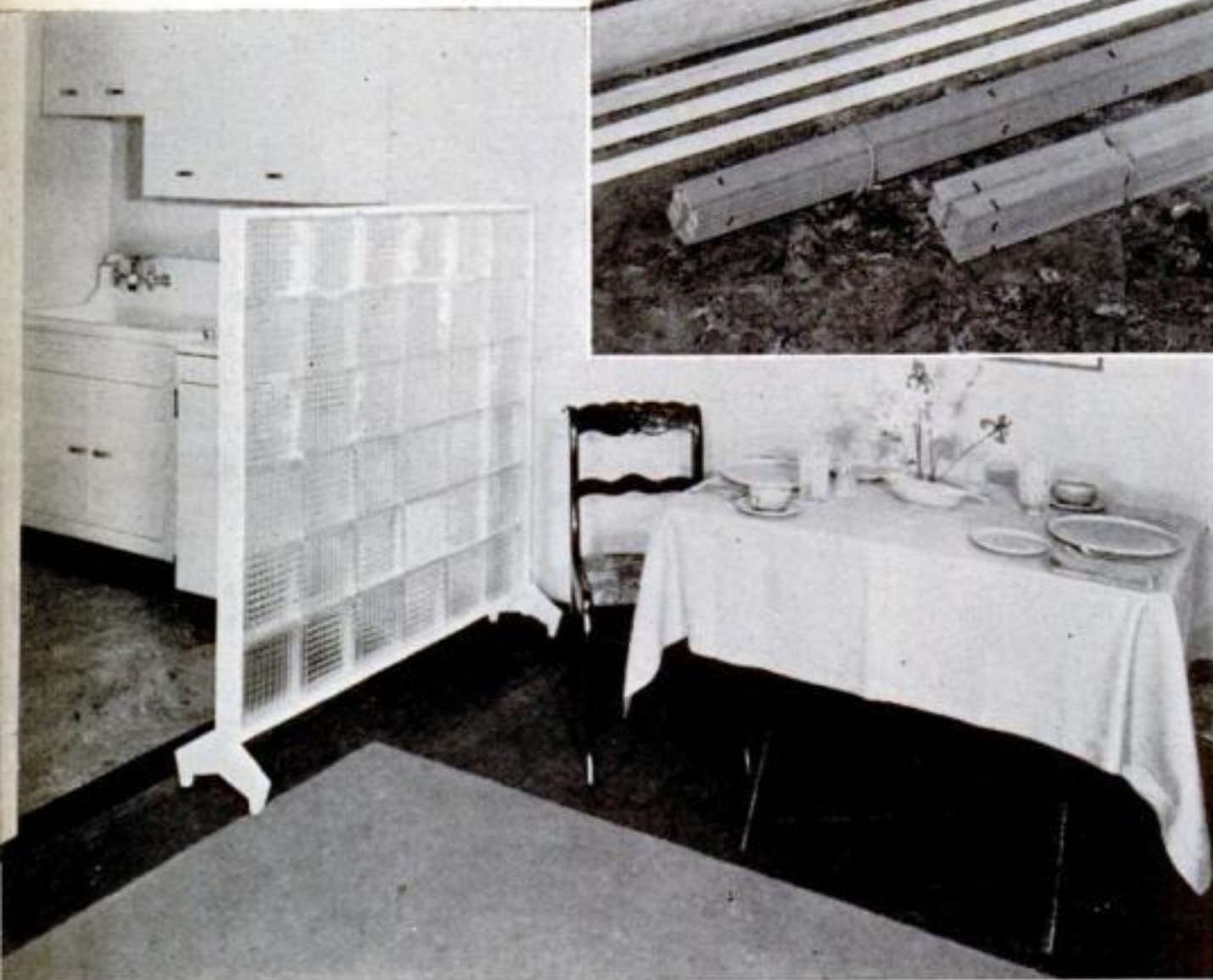
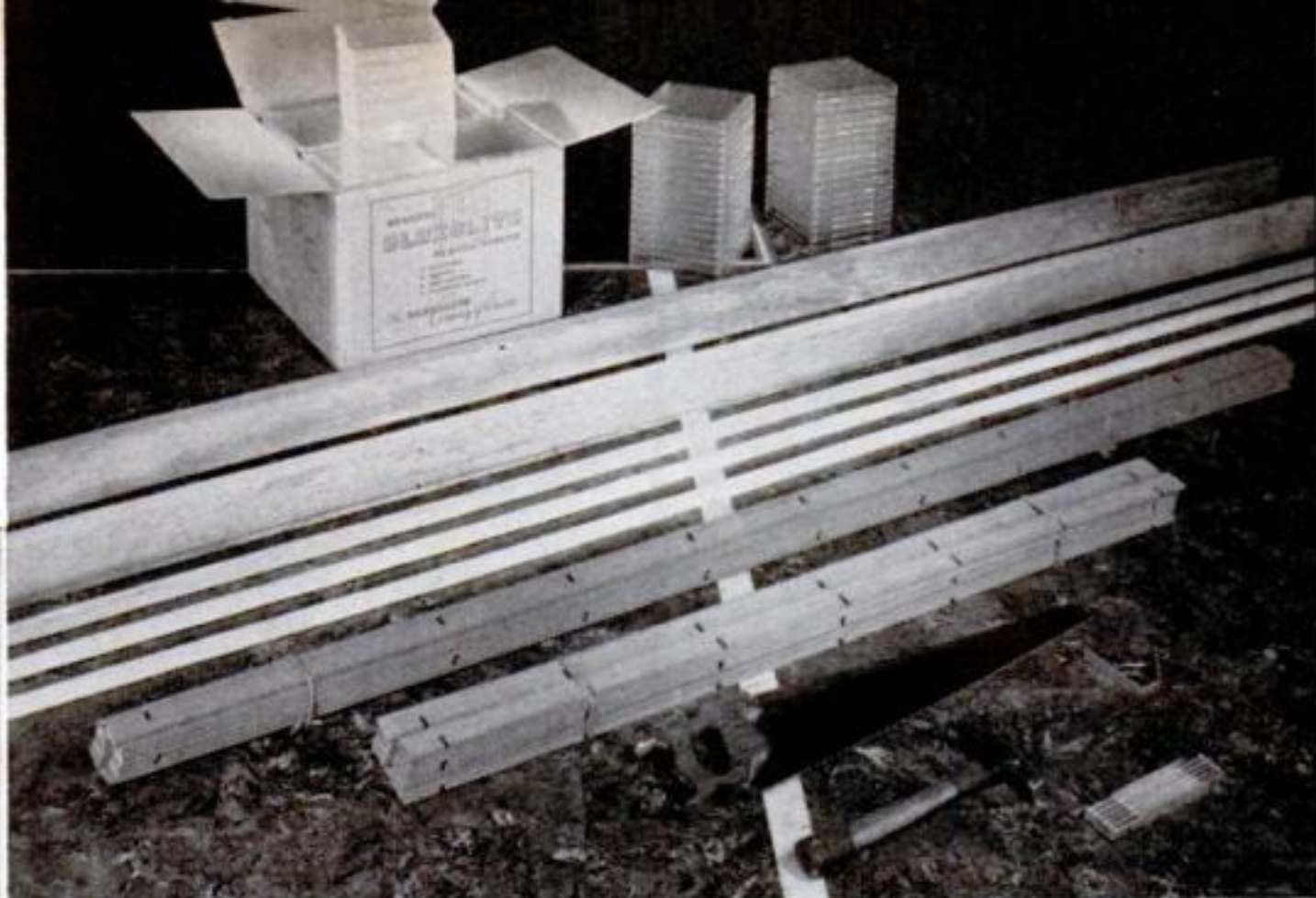


Wheelbarrows with brakes. A hand-grip brake would make it easier to handle loads going downhill. It would also keep the wheel from kicking back when the barrow is tipped for unloading.—James A. Purington, Brunswick, Me.



Rectangular dish pans. The old round pan wastes space because it doesn't fit either the dishes or the sink. Small feet on the bottom of the pan would keep it from blocking the drain.—Mrs. O. J. Smith, Sedalia, Mo.

All materials you need to build plastic-brick partition wall are shown at right. A ruler and three hand tools—hammer, saw, and square—are only tools needed. No cement or mortar is used. Two-by-fours and quarter-round molding are framing pieces. Notched strips form squares for plastic blocks.



Portable partition of plastic blocks screens dining area from kitchen in photo at left. Partitions can also be built permanently, as shown on the opposite page. Light weight is feature of these blocks. Each one weighs only slightly more than half a pound.

Plastic Bricks Make Partitions Easy to Build

IF YOU can use a hammer and saw, you can turn out a professional-looking partition wall with these new plastic blocks.

No mortar or adhesive is used. Grooved and notched basswood lattice strips interlock to form a framework of squares. Then the plastic plates, or half blocks, are pressed

into the squares from both sides of the frame. Lugs on the sides of the blocks snap into the grooves in the lattice strips, locking the blocks in the squares.

The lightweight $\frac{3}{8}$ " blocks are molded of polystyrene. They are $7\frac{1}{4}$ " square. Fitted into the frame of squares, they make a wall $2\frac{3}{8}$ " thick. The lattice strips are $\frac{1}{4}$ " thick, $1\frac{1}{2}$ " wide, and are notched at 8" intervals.

The translucent partitions insure privacy yet provide 80-percent light transmission. You can get unusual effects in a partition by varying the direction of the ribbing on the blocks, by using internal lighting, by removing an occasional block and putting a small plant in the opening, or by enclosing figurines in some of the blocks.

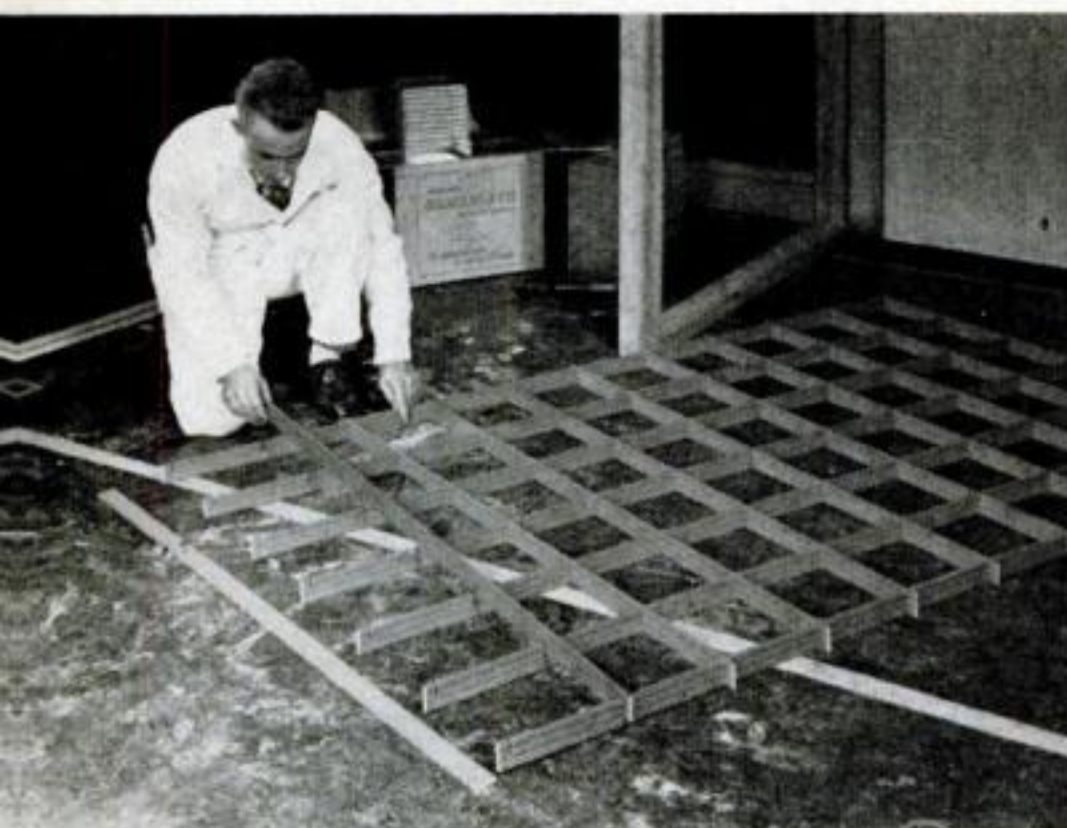
Both blocks and lattice strips are products of the Bloxolite Co., of Pittsburgh, Pa. The blocks cost 90 cents apiece and the lattice strips 20 cents a running foot. A partition costs about \$2 a square foot.



After determining height and width of partition, two-by-fours are cut to size and nailed. Either miter or butt joints can be used.



To allow for possible chipping or splintering of ends of lattice strips in shipping, they come longer than needed and must be sawed off.



Prenotched lattice strips are laid in position on floor. When assembled, the lattice unit looks like an oversize egg crate.

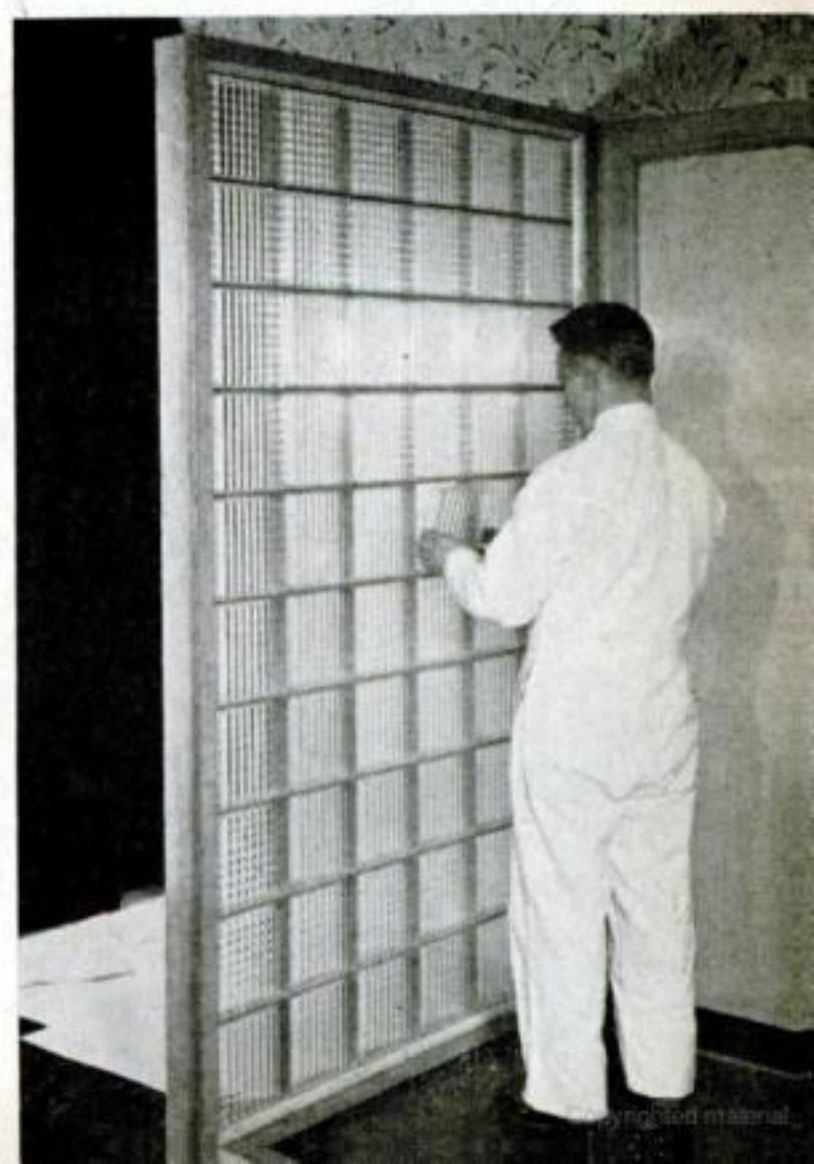


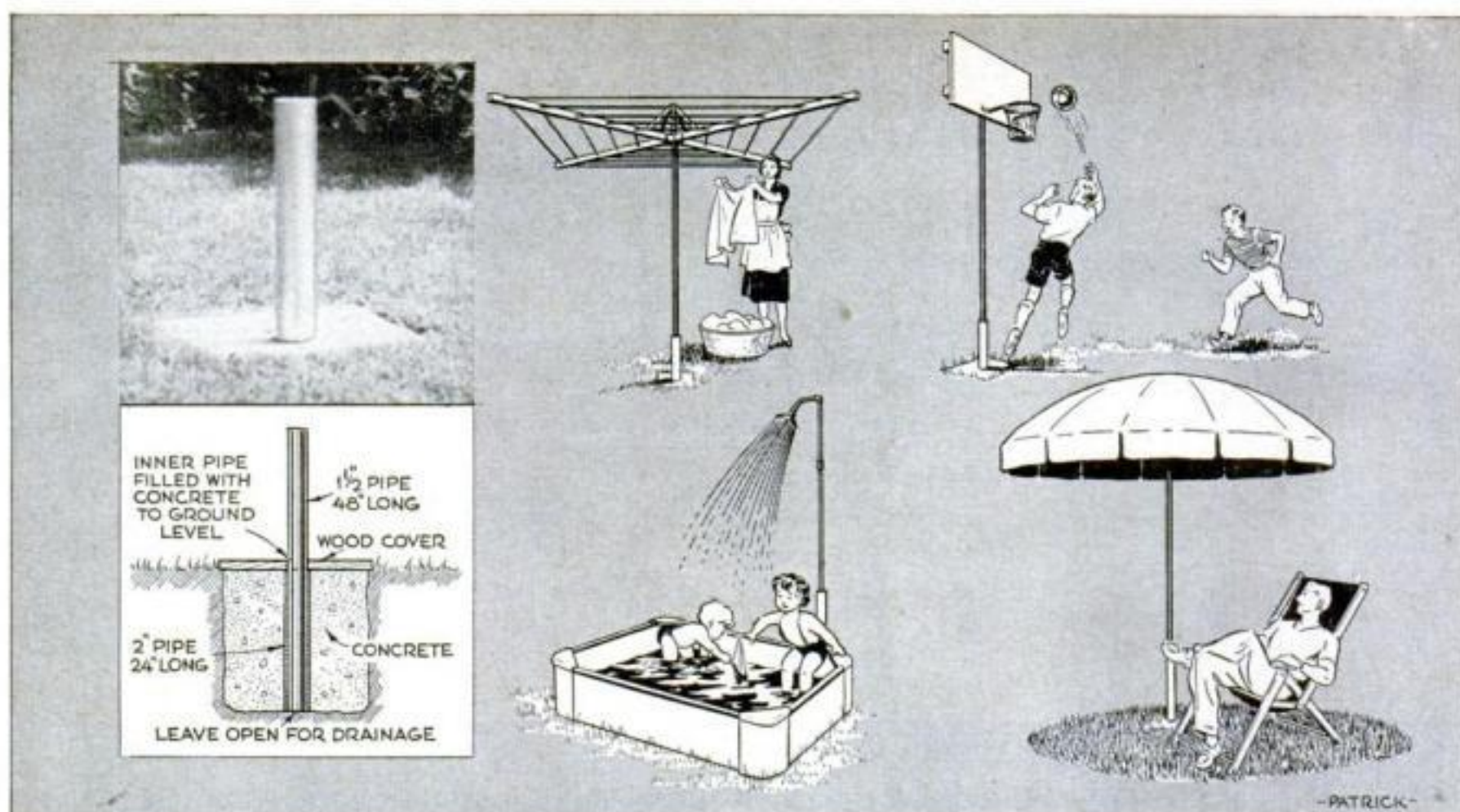
To hold lattice unit square and keep it from wobbling while being lifted into frame, a few rows of blocks are inserted on one side.



Quarter-round molding is nailed inside one side of two-by-four frame. Lattice unit is inserted (left) and quarter round is nailed on other side.

Last block is being fitted at right. This is maximum-size panel, but bigger openings can be covered by adding more 6-by-10 block panels.





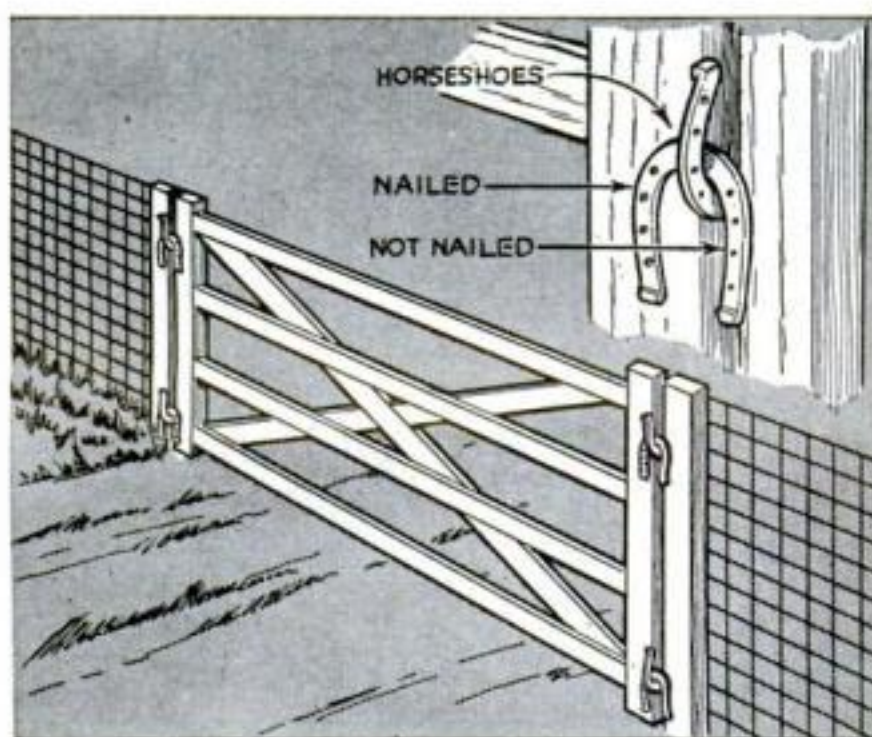
Pipe Holds Yard Equipment

WE GET more mileage from our yard since we sank into the ground a piece of pipe that can hold a variety of garden and play fixtures in turn.

I dug a hole 2' deep, set in a length of 2" pipe, and filled in around the pipe with concrete. A longer piece of 1½" pipe fits

inside this socket and acts as a support for an umbrella, clothesline, shower head, and bird bath. The removable inner pipe is filled with concrete to the level of the garden so that the fixtures will stand at their accustomed height.

A wooden cover around the concrete fill levels off the garden.—*Charles E. Crowe, La Crescenta, Calif.*



Fence Section Is Removable

OCCASIONALLY it may be necessary to remove a section of fence. If such occasions are too infrequent to require a gate, you can build the removable section as shown here. Nail horseshoes to the section and to the posts at each end. The shoes on the section hook over those on the posts. Don't try to swing it wide without unhooking both ends.—*Victor H. Lamoy, Upper Jay, N. Y.*



Garden Chores Made Easy

THE Little Farmer, shown in photo above, is a 1-horse cultivator that sells for less than \$100. Designed especially for city and small farm gardens, it weighs about 100 pounds and is operated by a four-cycle, one-cylinder Briggs and Stratton gasoline engine. It is compact enough for stowage on its side on most automobile trunks. The single steel traction wheel, turned by a gear-and-belt drive, is loaded additionally by a removable 25-pound weight out in front. The Will-Burt Co., Orrville, Ohio, makes it.



Home Atom Labs Are Coming

By Kenneth M. Swezey

Author of After-Dinner Science



A radium-dial watch in one of the matchboxes shows how radioactive atoms act as tracers in

research. No matter how boxes are shuffled, a Geiger counter will identify the "tagged" one.

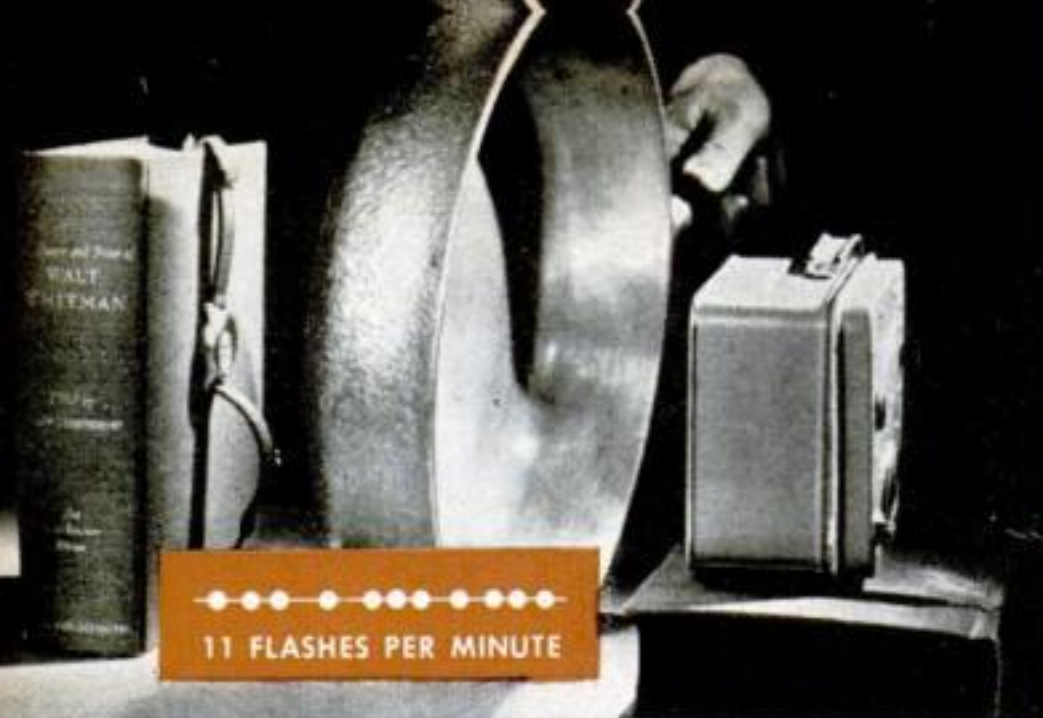
A NUCLEAR engineer of tomorrow may soon be watching the behavior of atoms on your kitchen table. Just as many modern chemists got started with toy chemistry sets, so today's youngsters will begin scientific careers with atom-lab toys that really work.

Your own ten-year-old may take a peek into his future in the murky ball of a midget Wilson cloud chamber, while you borrow his Geiger counter to go prospecting for uranium.

Up to now Geiger counters and other

radiation detectors have cost real money. But research is bringing costs down. A Geiger counter you can build for less than \$30 was described recently in *POPULAR SCIENCE* (March, 1950, p. 200). Inexpensive kits are now appearing on the market and ready-made counters are more widely available. Soon a toy maker will mass-produce a practical instrument that'll sell for \$18.50, and a whole kit for experimenting with atomic radiations for \$42.50.

To appear on the market this fall, the



GAMMA RAYS, most penetrating of nuclear radiations, go through heavy aluminum skillet



as if it weren't there. But cut-glass dish blocks them. Lead in the glass is effective shield.



BETA RAYS, high-velocity electrons, penetrate thin sheet metal but are stopped by a hand.

ALPHA RAYS cause scintillations on screen of spinthariscopes. But sheet of paper stops them.



A. C. Gilbert Company's "Atomic Energy Lab" will include a Geiger counter, spectro-scope, electroscope, Wilson cloud chamber, spinthariscopes, radioactive standards and specimen ores, and materials for building atomic models. With it, any youngster—and his Dad—can actually do the experiments that led Becquerel, Crookes, Curie, and Rutherford into the atom. A preview of some of the stunts is shown on these pages.

If there's prospecting blood in you and you hunt in the right places, the Geiger counter might even help you discover uranium. If the ore is rich enough, the U. S. Government will pay you a bonus of \$10,000 plus a guaranteed price per ton. "Prospecting for Uranium," a booklet prepared by the Atomic Energy Commission and the U. S. Geological Survey, and supplied with the kit, tells how to go about it.

The Geiger counter, resembling a small lunch box, is used to count beta and gamma rays. Every time such a ray hits the box, it goes right in, continues on through the shell of the Geiger tube, and momentarily ionizes the low-pressure gas there. This causes a neon tube to flash and a click to be heard in an earphone.

Before each test, radioactive materials should be removed from the vicinity and a count made of background radiation—the number of clicks heard when no known source of radiation is present. This background count must always be subtracted from the total. The flashes per minute in the tests shown in the photos are indicated by diagrams. Background flashes have been already deducted.

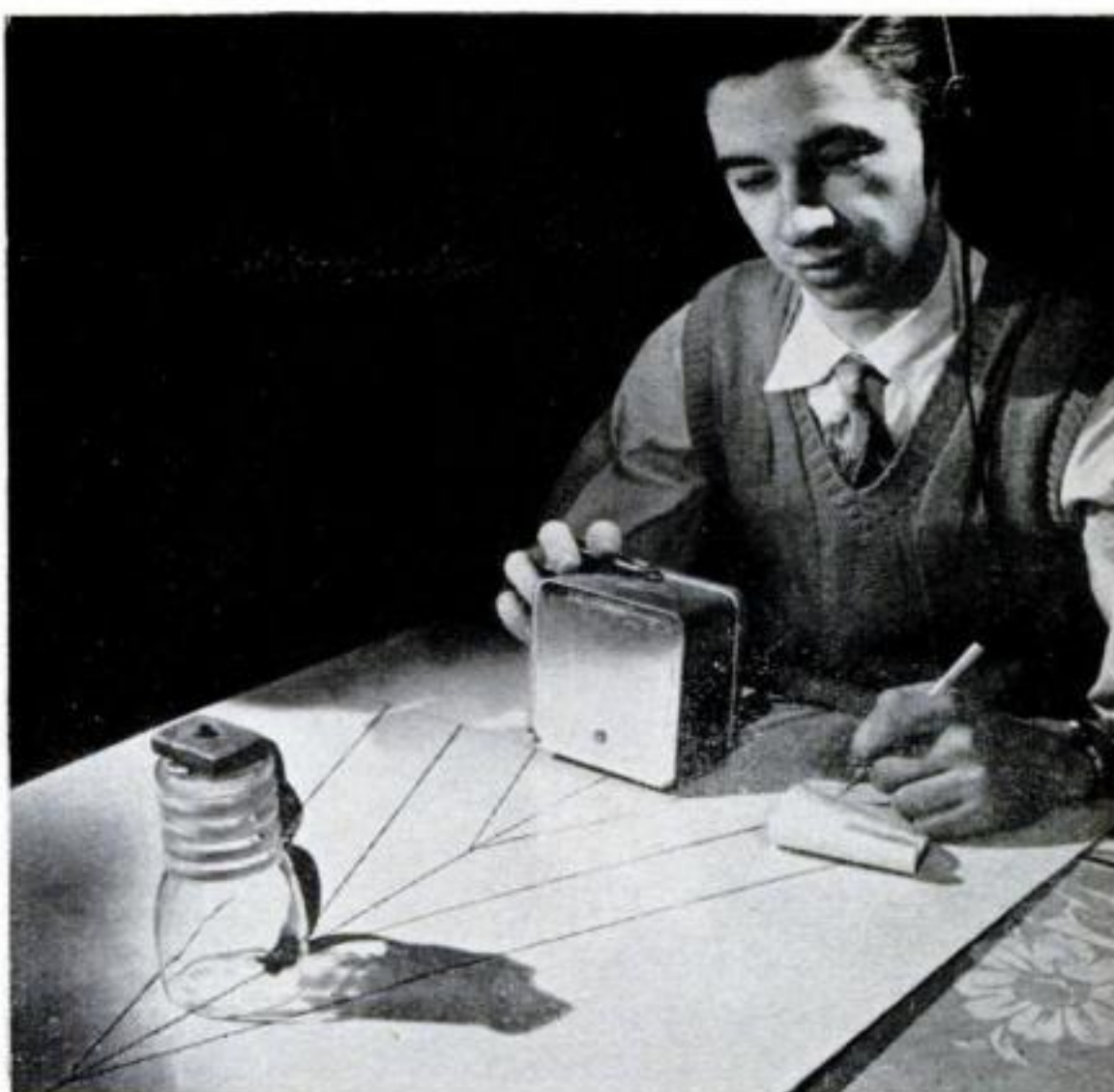
Two of the three main types of radiation from radioactive substances can be detected with the Geiger counter. Let's start with the

most penetrating—gamma rays. These aren't conventional particles but are electromagnetic waves similar to very short X rays, and travel at the speed of light.

You'd hardly expect ordinary light waves to penetrate the bottom of a heavy cast-aluminum skillet, but gamma rays from the radium dial of your watch go through it as if it were clear glass. Prove it by supporting the watch about 9" from the counter, taking a count, interposing the skillet, and taking another count. The second will be only a few flashes less than the first.

Oddly enough, a heavy cut-glass dish, which you can see through easily, may pass gamma radiations hardly at all. The glass contains lead, which is effective in cutting them off. That's why lead is used as shielding around dangerously radioactive materials.

Beta rays, which are negatively charged particles traveling with speeds as high as 160,000 miles a second, can squeeze through a thin sheet of aluminum, but can't penetrate a quarter-inch of plastic or a half-inch of plywood. At atomic plants, safe shields against beta rays can therefore be made of transparent plastic. If rays that



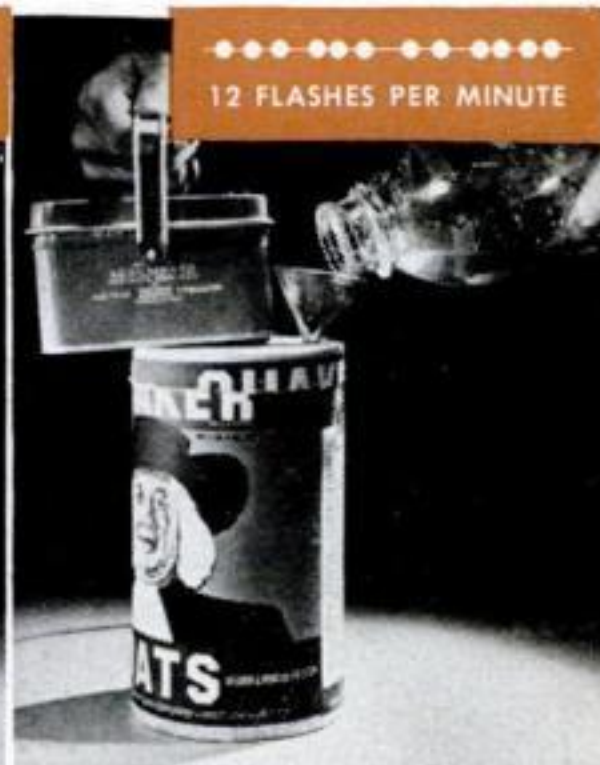
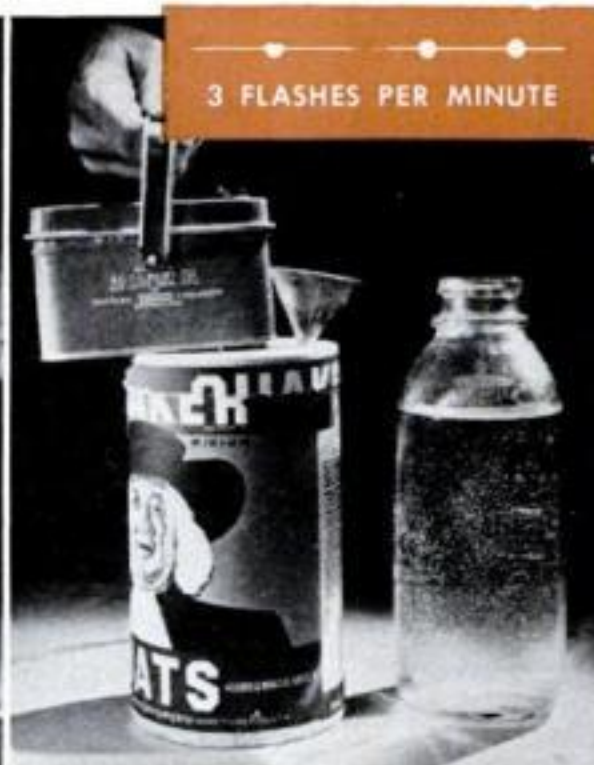
Like light waves, gamma rays diminish inversely with the square of the distance from the source. The count from a radium-dial watch at various distances proves it.

reach the Geiger counter are purely beta, they can be cut off by interposing your hand.

Alpha rays—heavy nuclei of helium atoms—can be stopped by even a thick sheet of paper. They consequently can't get through the tube wall to affect a Geiger counter at all. But let them fall on the zinc sulphide screen of a spinthariscopes—the little black tube shown at the bottom of the facing page—and they put on a spectacular show. Shot



Atomic liquid-level indicator can be demonstrated with this setup. Radium-dial watch in watertight float is put into empty, waterproofed



carton. As water is poured in, flashes of Geiger counter increase according to inverse-square law. Height of water can thus be calculated.



Wilson cloud chamber dramatically traces path of alpha and beta particles by droplets of con-

out at a rate of 10,000 miles a second by an exploding atom, each alpha particle hits the screen with such tremendous impact that it creates a flash of light.

All three rays diminish inversely with the square of the distance from the source, the



ALPHA CLOUDS



BETA CLOUDS



GAMMA CLOUDS

densed vapor. Gamma rays, which are not traveling particles, show up as irregular jiggles.

same as light. You can test this principle best with gamma, because these rays go farthest and do not deviate from their course. If you support a radium-dial watch 6 inches from the counter and take a reading, and move it to 12 inches away and take another, you'll get about four times as many flashes or clicks at the first setting as at the second.

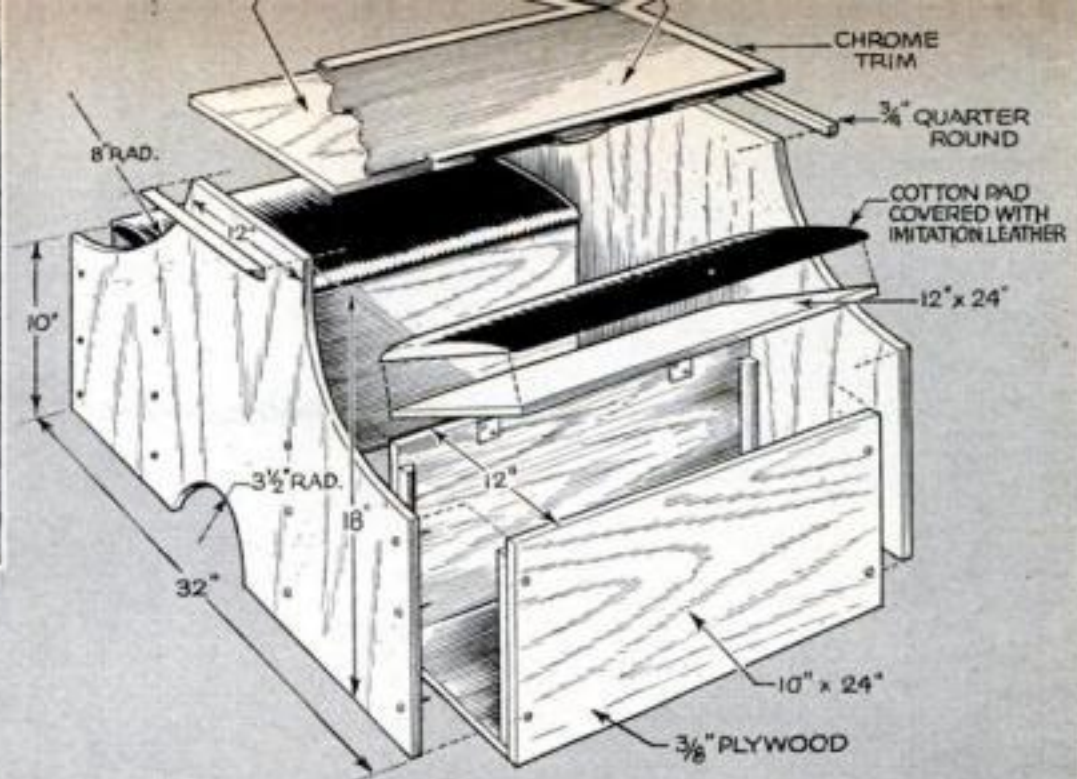
This principle is used industrially to determine the level of liquids in opaque, closed containers. A radioactive substance is placed on a float. The rise or fall of a liquid can be calculated by reading a counter at the top of the container.

Any physicist will tell you that the Wilson cloud chamber is one of the most entertaining gadgets in his lab. There's a cloud chamber in the Gilbert set. One of the oldest tools of the atomic physicist and still one of the most useful, it gives a startling visual demonstration of the effects of atomic radiations in action. Rays are caused to streak through supersaturated vapor above the surface of an ink-colored mixture of alcohol and water. As the rays plough through the vapor they ionize air molecules in their path. Vapor condenses on these molecules, forming a telltale cloud track that traces the radiation's course.

END



You can play prospector by using Geiger counter to locate radioactive objects under board.

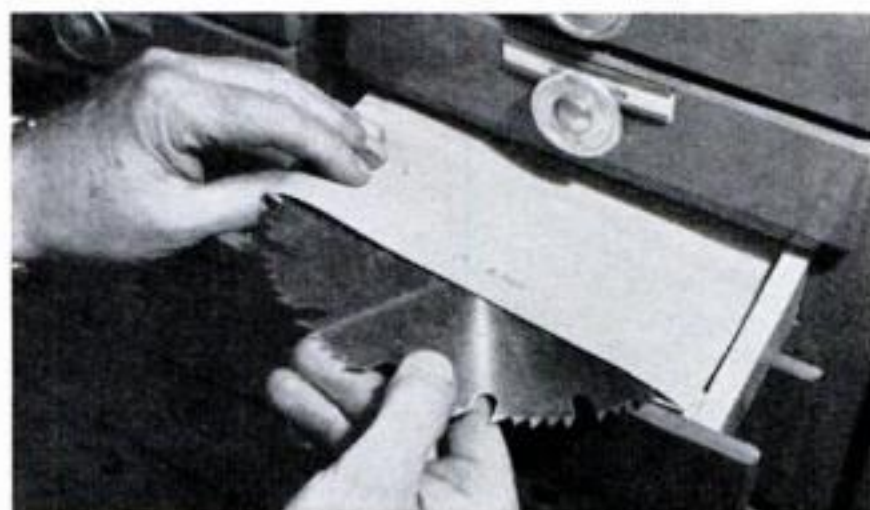


Combination Toybox-Table Set Saves Space

OUR little boy needed a toybox and a table-and-chair set. Since we had to watch space as well as dollars, we built the inexpensive combination illustrated above. We used $\frac{3}{8}$ " plywood; $\frac{1}{4}$ " stock might do but would be a bit light. The table top is covered with linoleum and edged with chrome

trim. Seats are topped with a layer of cotton batting and covered with waterproof imitation leather.

The finished piece can be enameled or stained and varnished. Nursery decals will help brighten the appearance.—*Claud C. Hurd, Columbus, Ohio.*



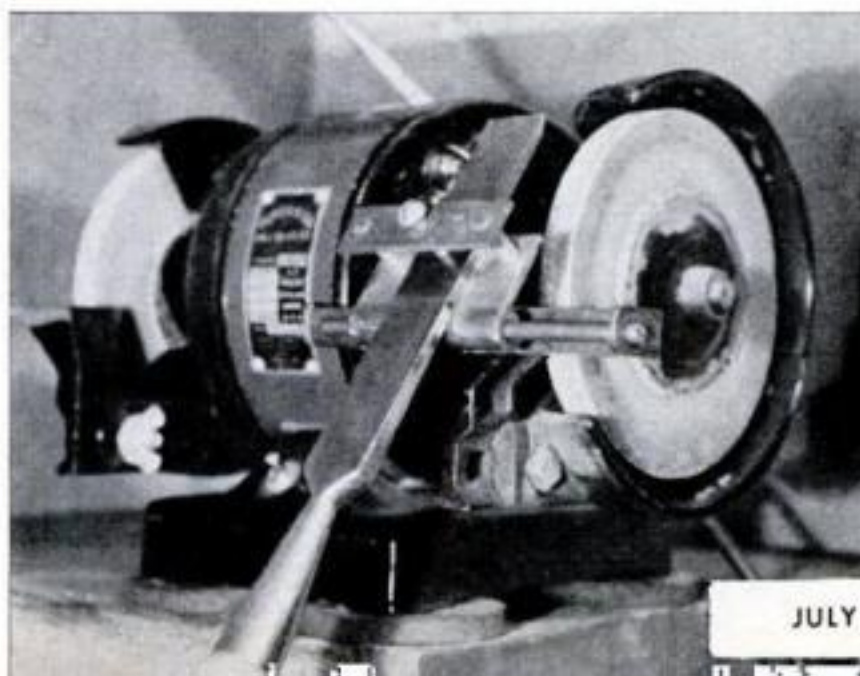
Saw Blades Stored Compactly

EXTRA circular-saw blades kept on pegs or nails take up a lot of wall-rack space and can be hazardous. You can store them safely and compactly in a shallow drawer. Protect the teeth by slipping each blade into a Manila envelope—the heavy brown-paper kind. Cut off the flap ends, and mark the saw type on the outside of each envelope.—*Will Thomas, Kenmore, N. Y.*

Hollow-Grinding Fixture

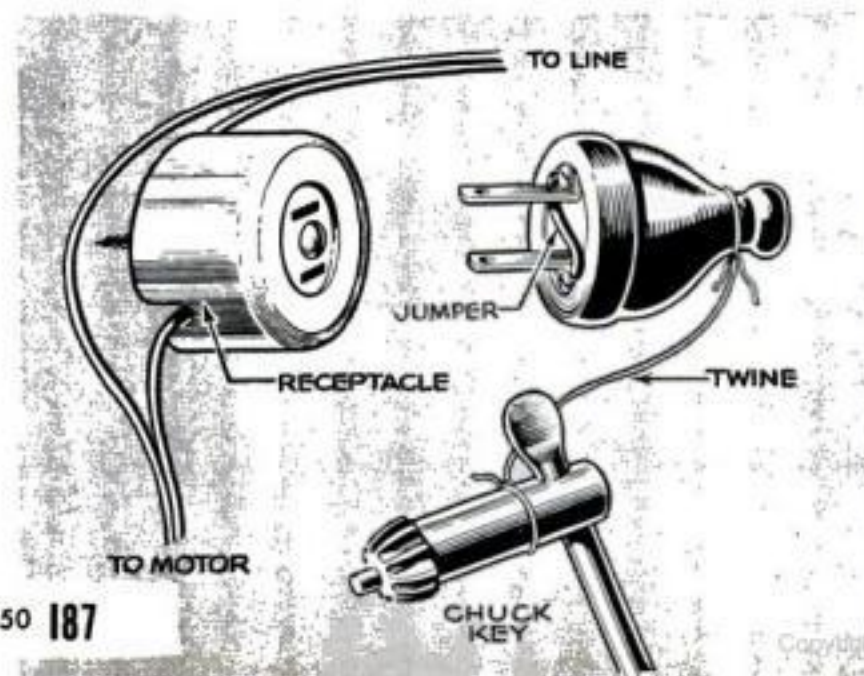
CHISELS and plane irons can be accurately hollow-ground on an ordinary wheel with the help of the fixture shown below. It's made from a hinge that slides on a $\frac{1}{4}$ " rod. The rod is mounted on a U bracket that clamps to the regular tool rest.

A strap is riveted across the hinge with $\frac{3}{4}$ " spacers between. A bolt turned into a threaded hole in the strap secures the tool to be ground.—*E. N. Horr, Cleveland, Ohio.*



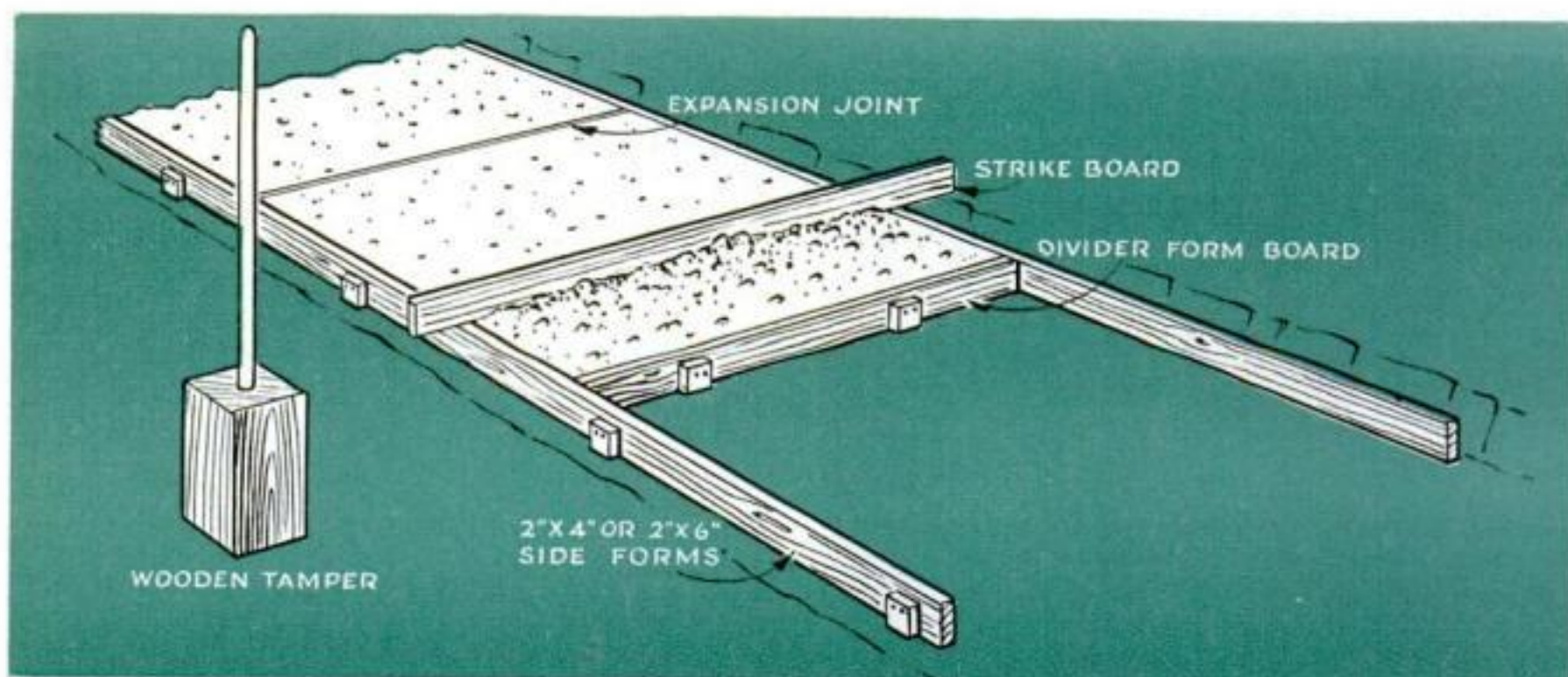
Plug Pulls Drill-Chuck Key

IF YOU'VE ever forgotten to remove the chuck key before starting your drill press, you know that the key may be slung with wicked force. After one close call I wired a receptacle in series with the motor, shorted a plug with a jumper, and tied the chuck key to the plug. Now I can't start my drill press unless the plug is in the receptacle, so the key has to be out of the chuck.—*Martin Berman, Cincinnati, Ohio.*





Improve Your Home With Concrete



SIDEWALKS

WALKS are usually 4" to 6" thick. If used only as a walk, 4" is enough. If cars will drive over a walk, it should be 6" thick.

Concrete can be poured directly on the ground if the soil is well drained. If it's not in a location where drainage is good, a 6" layer of coarse gravel or cinders should be laid down. In any case, use a tamper.

Two-by-fours held in place by stakes usually are used as forms. For drainage, a walk should slope to one side about $\frac{1}{4}$ " per foot. Place one side of the two-by-four forms higher than the other to get a slope.

In building a walk or driveway, you should provide contraction and expansion joints. Place 1" thick divider boards every 4' to 6'. Pour concrete in every other sec-

tion. When these sections are hard enough to be self-sustaining, remove the divider boards. When concrete is poured in the remaining sections, the slabs will be sufficiently separated.

A walk can be poured continuously—without waiting for every other section to harden—if you place strips of tarred felt against each divider board. Pour concrete on both sides of the divider boards. Then pull out the dividers. The felt, made for the purpose and sold in most supply yards, stays permanently between the slabs.

As you pour the concrete, level it off with a strikeboard resting across the forms. Pass the strikeboard across the concrete with a sawlike motion. Several hours after the concrete is poured, finish it with a wood float to produce a smoother surface.

WHETHER you live in a small home or a big house, have an average yard or a broad lawn, you'll find concrete can make useful and decorative additions.

Maybe you've never tried working with concrete. It's not too difficult. Follow the rules and start with some simple project—like making a flagstone walk. You'll have the hang of it before you finish the job.

The tools you need are simple—trowels, measuring equipment, shovel, hoe, pail, and a mixing platform. The mixing platform should be watertight so you won't lose water through it during mixing. And make the platform roomy enough to work on.

Accurate measurement of all materials—including water—is important. For water, you can mark the inside of a pail at different heights to indicate quarts and gallons. The

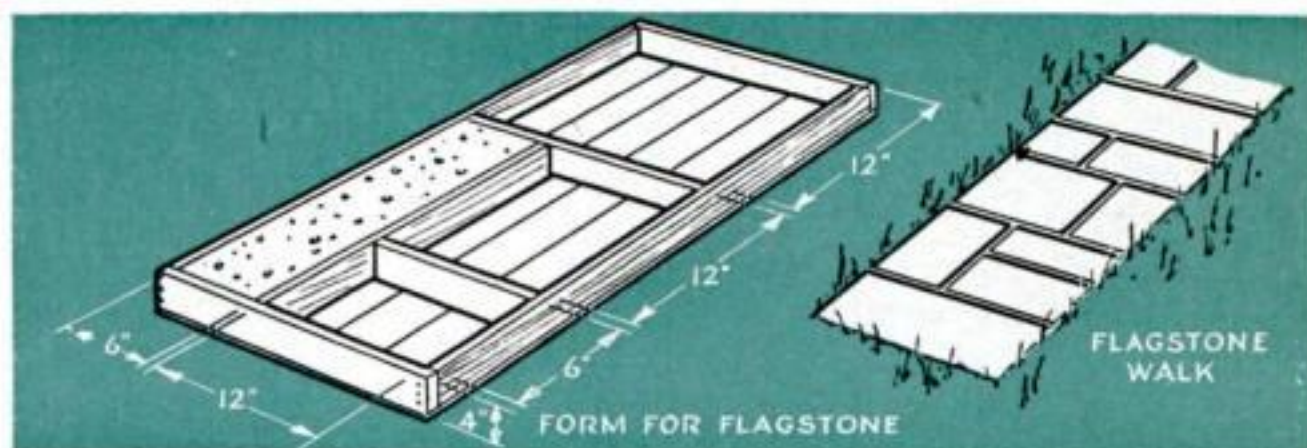
easiest way to measure sand and pebbles is in a bottomless box. Build the box with these inside measurements: 1' deep by 2' square. Inside the box draw lines 3", 6", and 9" from the bottom. When the box is filled to the 3" level with sand or pebbles, you have 1 cu. ft. The second level gives you 2 cu. ft.; the third, 3 cu. ft.; and filled to the top you get 4 cu. ft.

Of course, you need lumber for forms. Concrete is heavy—from 130 lb. to 150 lb. per cu. ft. So be sure to build the forms strong enough and use plenty of bracing. Before pouring concrete, it's a good idea to oil the forms. This makes removing them easy. Use a rag or old paintbrush and smear the inside of the forms with old crankcase oil. Another oiling mixture is equal parts of boiled linseed oil and kerosene.

FLAGSTONE WALKS

A SIMPLE form for casting concrete flagstones is shown at the right. You can vary this design to suit yourself, even making triangular stones. Or, you can dig irregular holes in the ground where the walk is to be and pour the concrete into the holes, smoothing it off with a wooden float.

If you use a wooden form for your flagstones, assemble it with screws so it can be



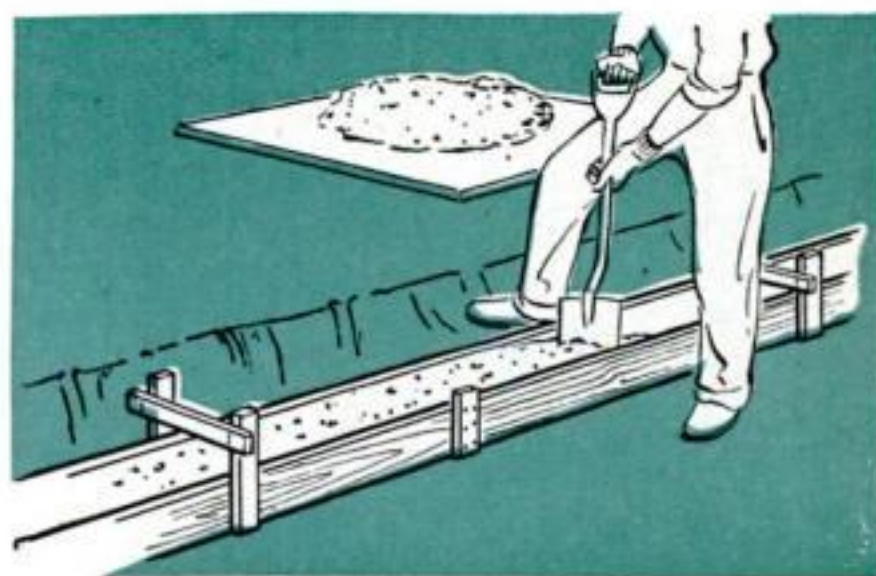
taken apart easily. You'll probably want to use it more than once. And oil the boards before each use. Mineral pigments often are mixed with concrete to make the flagstones of different shades.

LAWN CURBING

You can give your front yard a neat appearance—and at the same time stop soil erosion—by bordering it with low concrete retaining walls.

Dig down to a solid footing for the curbs and, if you live in a severe climate, carry the curb down below the frost line. You can use the sides of the excavation as a form if the earth is firm. If not, you'll have to put in forms to the bottom of the excavation. Build the wall at least 6" thick.

Be sure your forms are rigid and brace them well so they'll withstand the pressure of the wet concrete. Then you'll have a straight wall—one without bulges. To keep the sides of the forms evenly spaced, tie them together with spreaders. To obtain



smooth sides, thoroughly spade the concrete next to the forms. The top of the curb can be finished flat or round. Mineral pigments may be added to give the curb a color harmonizing with your house. And don't forget to oil the forms.

STEPS

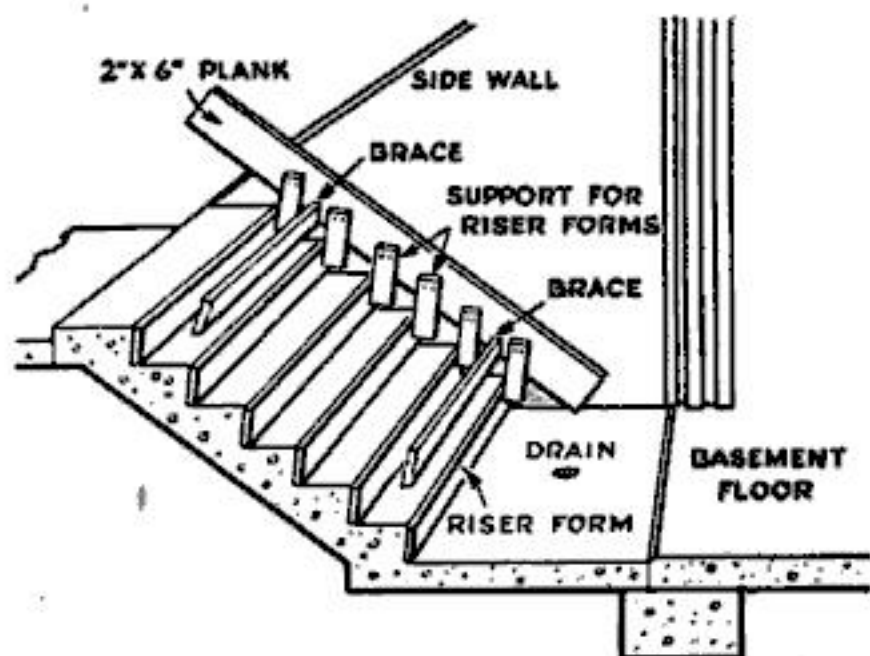
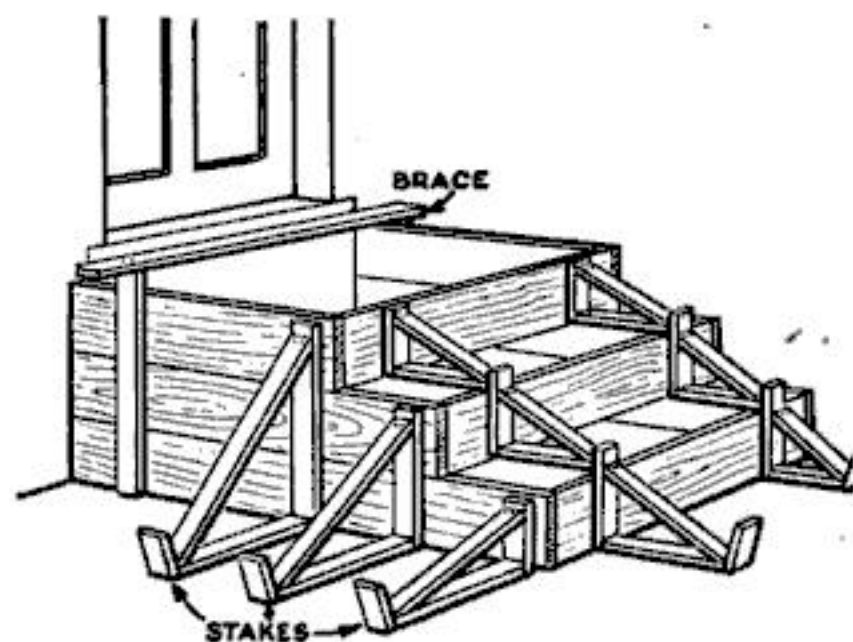
STAIRS probably receive more wear than any other part of your home. Concrete steps are fairly simple to build, easy to keep clean, and they won't rot or sag.

Be sure to make the rise of your steps low enough and the tread wide enough for safety and comfort. A good rise is $7\frac{1}{2}$ " and a tread 10". Build the forms of 1" or 2" lumber—2" stock is better—and brace them well so they won't bulge.

Some of the space inside the form of outdoor steps can be filled with rocks. Pour in some concrete, drop in rocks, pour more concrete, and top it off with a 6" layer of concrete. Using rocks will take up some of the space and save on concrete.

Pour concrete to the level of the first step. Then spade and compact it. Pour the next step and spade it. Continue until you've poured all the steps. Let the concrete set and then use a wooden float to finish the steps. This will leave a smooth but slightly gritty non-skid surface.

If small basement steps are placed on compacted ground or cinders, you don't need to reinforce them. But use metal reinforcing rods on wide or high stairs.



POOLS

A POOL dresses up any back yard—even a small one. You have a wide choice of sizes and shapes of pools. A design for a simple but attractive one is shown below.

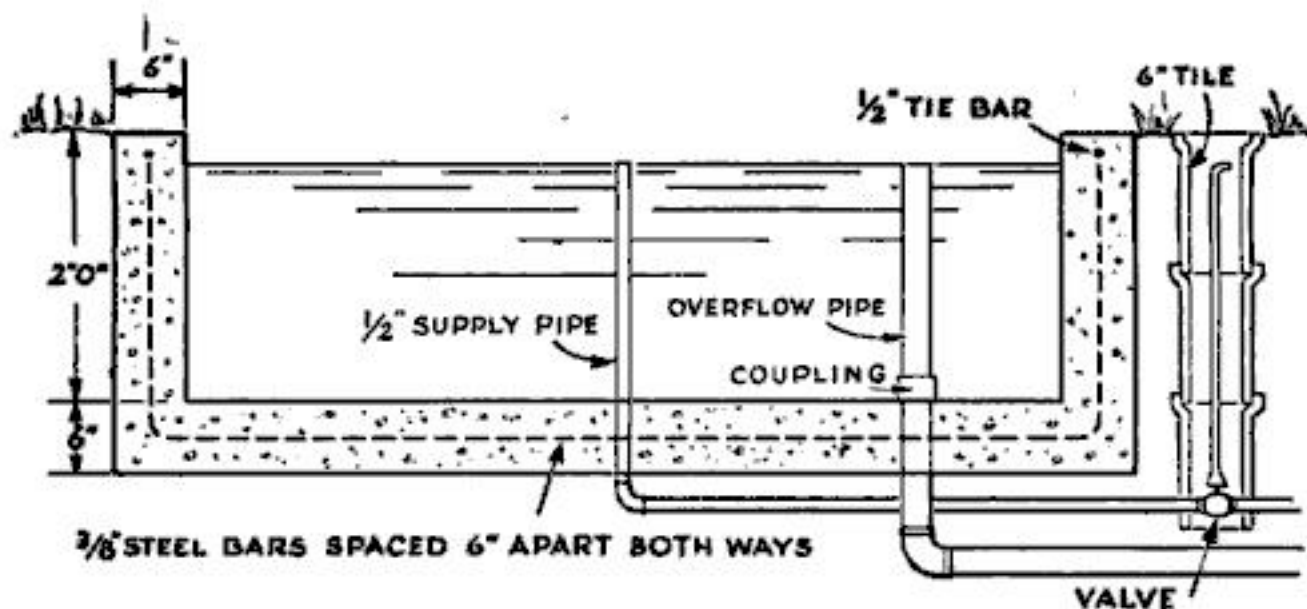
First step is excavating for the pool. No outside form is needed if the soil is firm and well compacted. If the soil is loose, both inside and outside forms are needed. Use 20-gauge galvanized iron as a form where you want to curve the sides or ends. Reinforcements must be used. Place supports

across the top of the excavation to hold the interior form 6" off the bottom of the pit.

You can fill the pool with a garden hose and empty it by siphoning, but plumbing connections are more desirable. Install all pipes before pouring concrete. In this pool, the overflow pipe also serves as a drain when you unscrew it at the coupling.

Pour the concrete for the floor and sides in one operation. Then there will be no joints and less chance of leakage. Pour about 6" or 8" of concrete at a time in the wall form. Spade and tamp it before pouring more.

Water in new pools may be alkaline—enough so that it may kill fish. First test the water with pink litmus paper that you can buy at a drugstore. If the paper turns blue when placed in the water, it's not safe for fish. Change the water weekly until the paper remains pink. Then the pool is safe for fish.

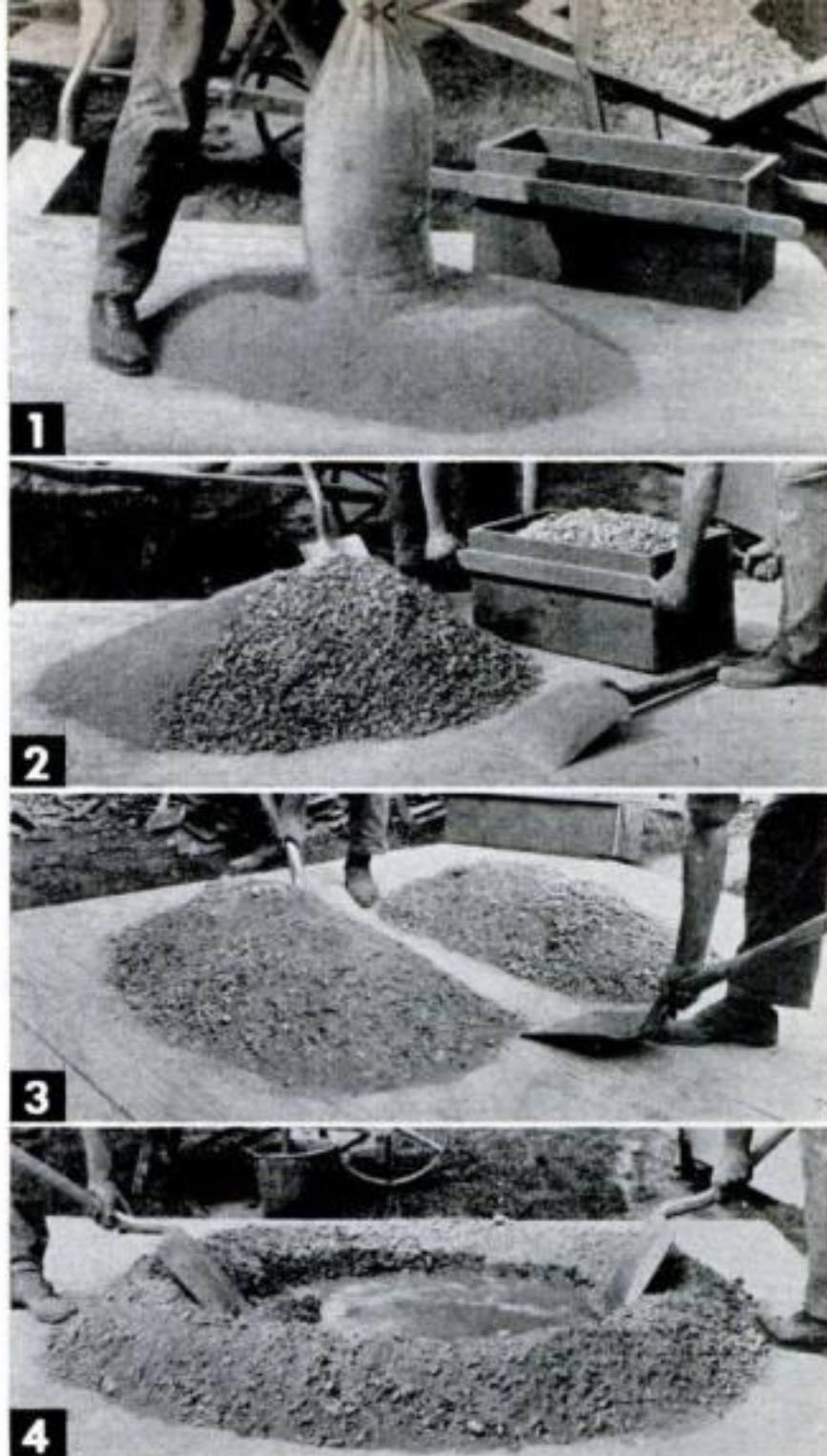


MIXING AND CURING CONCRETE

THE watertightness, strength, and durability of concrete depend on the proper proportion of water to cement. The table at the bottom of this page gives you mixtures recommended by the Portland Cement Association. It's a good idea to mix a trial batch first. You may find that the trial mix is too wet or too stiff to be workable. To correct a too-wet or too-stiff mixture, don't change the proportion of water to cement. Change the proportion of sand and pebbles. Cut down on the sand and pebbles if the mixture is too stiff. If it's too wet, add sand and pebbles slowly until you get a workable mixture. Concrete should be poured into the forms within 30 minutes after mixing.

A workable mixture has two requirements: it should pour readily and it should give you a dense concrete after spading and tamping. Each grain of sand should be coated with cement and each pebble coated with the sand-cement mortar. Spading concrete as it is poured is important. This forces the coarse pebbles away from the form. Then you'll have a smooth surface.

New concrete should not be permitted to dry out for a week or ten days. If concrete dries too quickly it does not harden properly and loses strength. Walks, steps, and pools can be covered with straw or earth and kept moist by sprinkling with a garden hose. Lawn curbing and walls can be covered with sacks or canvas and kept wet.



Steps in mixing concrete: 1. Measured amount of sand is spread out and cement added. This is thoroughly mixed. 2. Required amount of pebbles is added. 3. Mixing continues until pebbles are evenly distributed. 4. Then correct amount of water is added and mixed in.

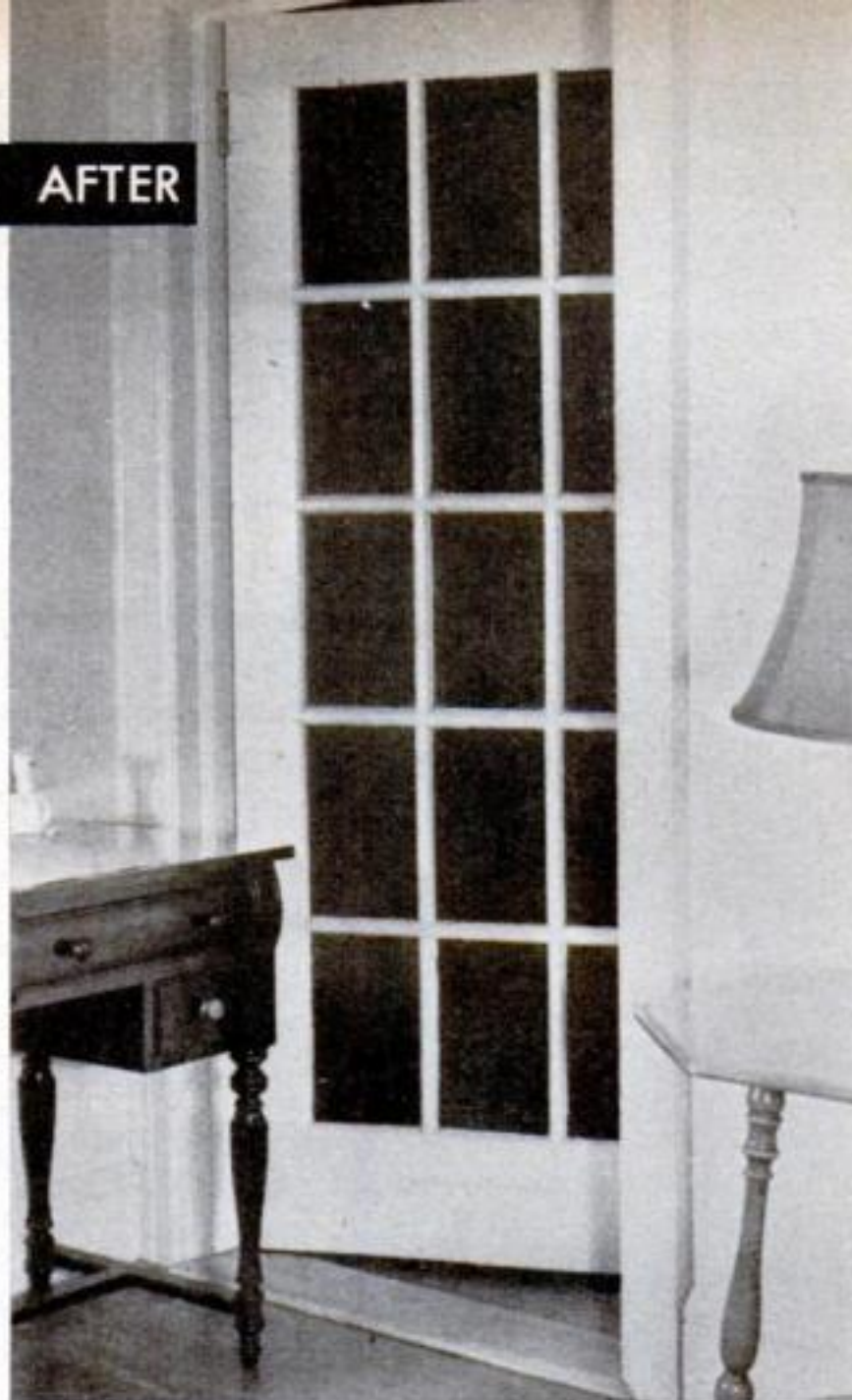
CONCRETE MIXTURES

Kind of Job	Wet Sand	Wet Pebbles	Sacks of Cement	Gal. of Water
	cu. ft.	cu. ft.		
Foundations, footings, and walls that need not be watertight, lawn curbs.	2¾	4	1	5½
Watertight walls and walls above ground. Sidewalks, pools, steps, driveways, basement floors, porch floors, cisterns.	2¼	3	1	5
Fence posts, flower boxes, benches, bird baths, work of very thin sections.	1¾	2	1	4

FOR YOUR POPULAR SCIENCE INFORMATION FILE



BEFORE AFTER



This desk was jammed behind a glass door because there was no other space. It didn't let the door open fully, and threatened the glass.

Rehung this way, door has ample swing space and there is enough room to walk by the desk. Door lock and hinges had to be swapped about.

How to Turn a Door Around

By Harry Walton

ANY door that can't be opened freely, without banging furniture or tangling with another door, is a candidate for rehanging. When a television set just has to go into a certain corner, a longer sofa replaces a short one, or a refrigerator is squeezed into a spot where its opened door hits a kitchen door, rehanging may be the solution.

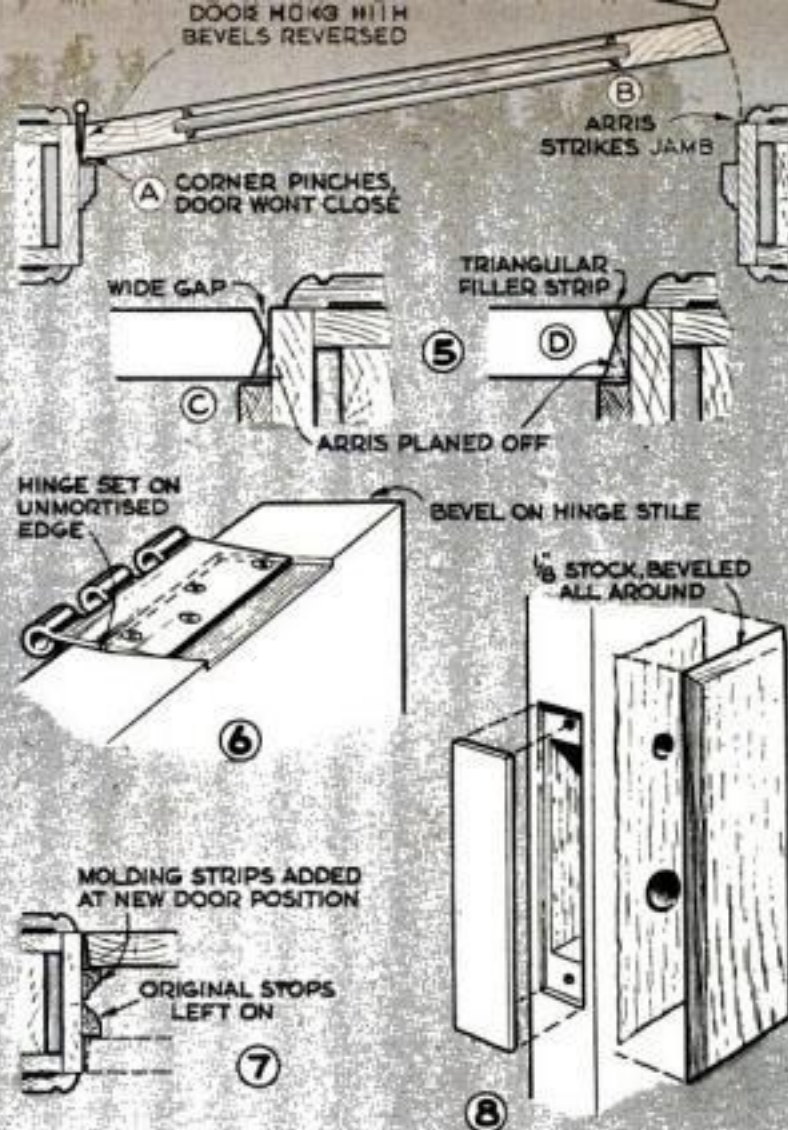
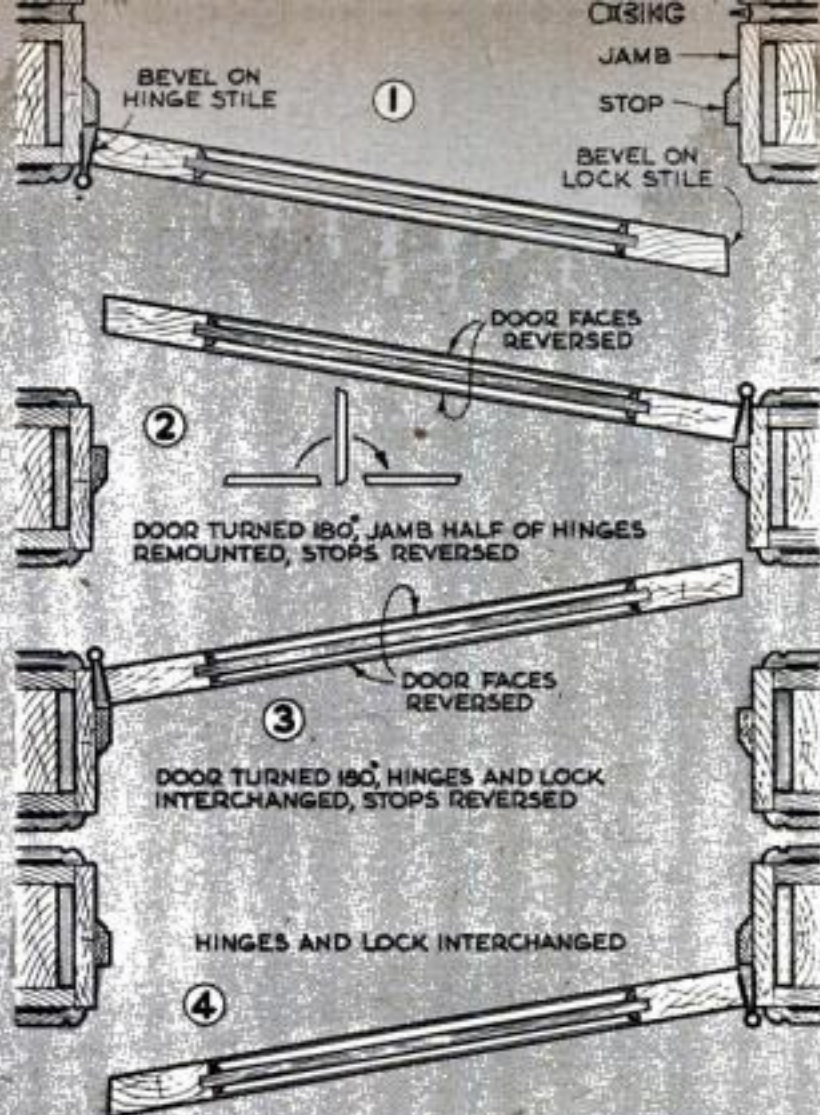
But don't rush for the screwdriver just yet. There are only four ways to hang a door—assuming you don't invert it, which is rarely

possible—and the other three may all be worse than the way it is now. Do you want it to swing into the same room, or the adjoining one, and from which jamb? Are the two door faces different in finish?

By studying Figs. 1 to 4, you'll soon know whether your door can be rehung to advantage. Two of the changes shown (Figs. 2 and 3) turn the door completely around. If one side is oak and the other off white, it will be a tough chore to refinish them.

If a door could simply be pushed from one side of the jamb to the other without turning it around, the change from Fig. 1 to Fig. 2 or 3 could be made without reversing the faces. But as the lock stile is beveled for clearance, the bevel would slope the wrong way, and the arris would strike the jamb, as at A in Fig. 5. Planing it off to fit would leave a wide gap, as at B. A filler strip could be fitted to close this, as shown at C.

Before deciding on such a compromise, better check the hinge stile. It's often beveled too, and if so, reversing the hinges



First step is to tap out the hinge pins, bottom one first, with door closed. Carefully lift door off the hinges with both hands, and set it aside in a safe place while you work on the casing.



If saddle is to be replaced, lift it with chisel enough to raise nails; then pull them. Stop strips on jambs went to the floor here. If yours fit over saddle, remove them first.

will bind the door as at D, Fig. 5. One way out is to set the hinge leaves in the old mortises, but on top of the unmortised strip as in Fig. 6. You may need slightly longer screws and, incidentally, the leaves that were on the jamb will now go on the door.

Mounting the hinges this way will widen the hinge gap. It may be neater to plane the hinge bevel completely off, building up the lock stile with a filler strip. (New doors are fitted with 1/16" clearance all around.) These methods are compromises, but may serve if you want to avoid refinishing.

If the door can be turned about, the

switch from Fig. 1 to Fig. 2 is easiest of all. The hinges are taken off at the jamb only, new mortises are cut in the other jamb, stops are reversed, and the lock strike re-mounted. But to rehang the door as in Figs. 3 and 4, the hinges must be remounted on the lock stile and the lock on the hinge stile.

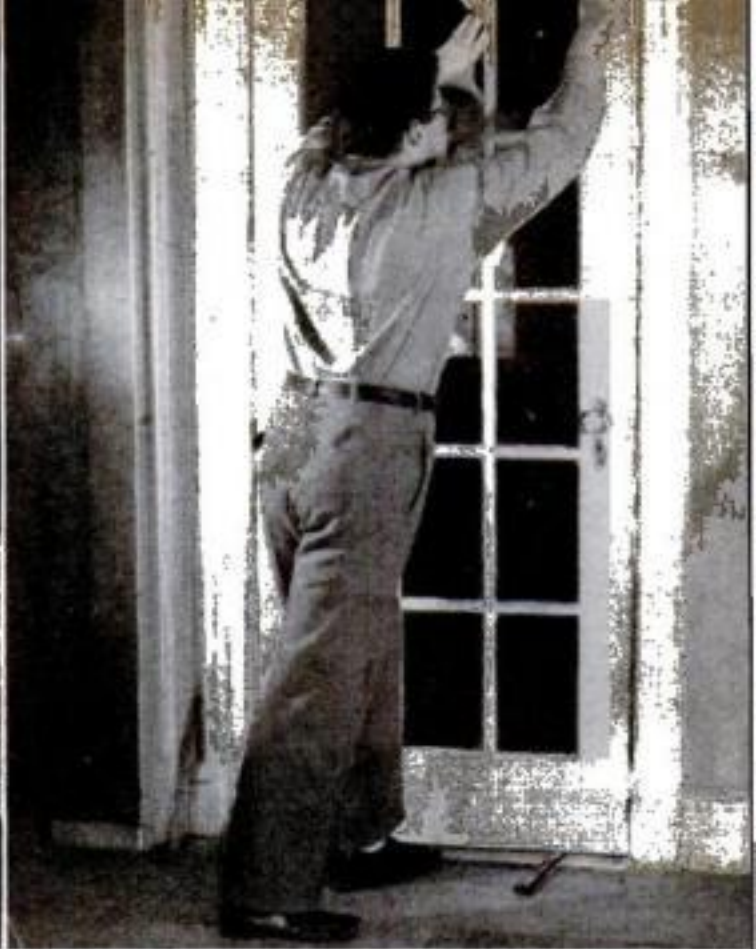
When a door is rehung from the other side of the jamb, as in Figs. 2 and 3, the standard saddle or sill won't be under it. If you aren't fussy about looks or underdoor drafts, you can simply put up with the gap under the door. Often it's not practical to



Drive chisel between jamb and stop to open joint. Pry cautiously, chisel bevel down, full length of strip. If nails pull through, draw them afterward. Sand off paint feathers.



If stops reach to floor, cut off $\frac{3}{8}$ ". Turn top one, swap others, and nail back temporarily. Locate them as far from the new hinge edge as they were from the old.



Pencil hinge locations on old lock stile. Stand door in opening on old saddle, with chisels beneath to raise it within $\frac{1}{16}$ " of top. Stab both stile and jamb with knife to mark mortises.

move the old saddle to the other side, for the floor surface left bare when you shift it won't match the rest of the floor, and may show a gap. The neat answer is an extra-wide saddle.

To get the width of the new saddle, measure across the jamb to the outside of both casings and add 1". Any mill can make a saddle for you, or you can plane two wide bevels on a $\frac{3}{4}$ " plank yourself. If the stops—those strips on the jamb against which the door strikes—go right down to the floor, the saddle will have to be notched around them. It's easier to cut the stops $\frac{3}{8}$ " shorter and fit the saddle under them.

The stops can be carefully pried off, interchanged, and nailed back on in the reversed position shown in Figs. 2 and 3. However, if you don't plan to install a new saddle under the door, you can leave the stops on and nail on narrow strips of molding for the new door position, as in Fig. 7.

To remount hinges on the jamb only (Fig. 2), rest the door on the old or new saddle, with chisels or wedges beneath, and mark the jamb mortises from the hinges on the door. In moving hinges to the other stile, mark stile and jamb simultaneously with a knife.

Should you chisel a hinge mortise too

New saddle should be 1" wider than distance across casing, and same length as old. With door off, scribe across jambs as shown. Mark jamb width. Cut corners to fit around casing.

At least one stop will have to be removed to put the saddle down. Fasten it with finishing nails. Then nail both stops on permanently. Set all nails well below the surface.

Close the old hinge mortises in both door and jamb with thin pieces of wood cut to fit. Fill crevices and nail holes with putty or composition wood. Sand and repaint the jambs.





Gauge mortises same width as old ones on both door and jamb. Cut tops and bottoms with a back saw as shown, or with chisel cuts. Since chisel crushes wood, start slightly inside lines.



Start cutting mortises with crosswise chisel cuts about $\frac{3}{8}$ " apart. Clean out with chisel held lower, its bevel down. Use half of hinge to test the mortise for depth and flatness.



Mount jamb halves of hinges with one screw each. Hang door, tapping hinges into alignment if necessary. Locate any binding point with paper as shown. Plane stile or fit shims to correct.

deep, put a cardboard shim under the leaf. If the mortise slopes because you've cut too deeply on one side or the other, a narrow strip of cardboard under the low side will remedy things. Run a strip of paper down the crack between stile and jamb to find just where a door is binding.

Thin pieces of wood, the same thickness as the hinges, do a neater job of closing old mortises than putty or other filler. Glue or brad them in. Similar pieces will close the old lock mortise on the door and the strike-plate mortise in the jamb. A similar thin panel can be used to conceal the area uncovered by removing the lock escutcheons

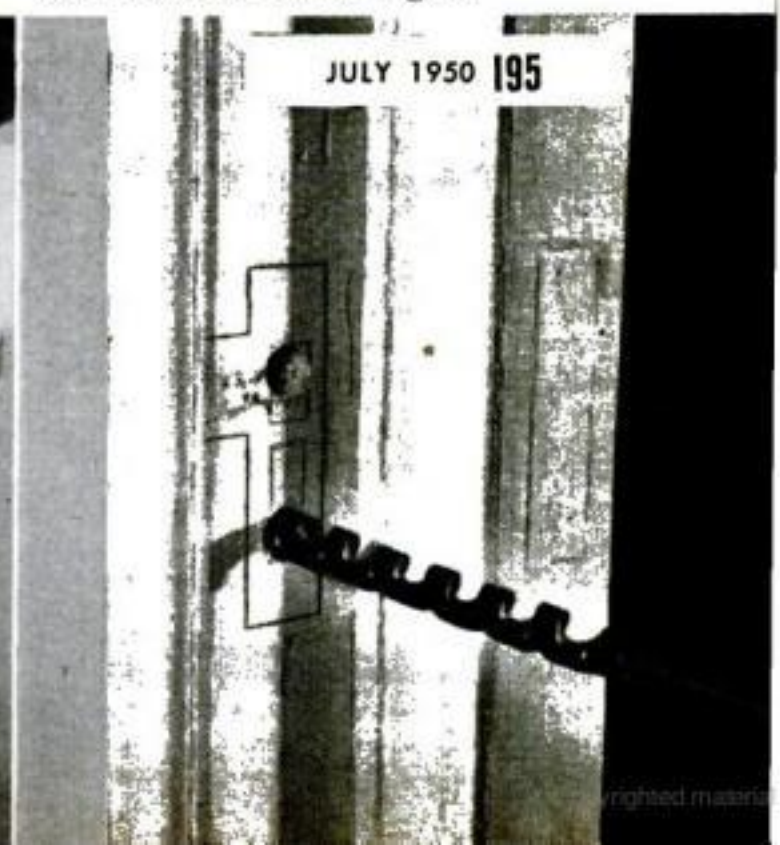
(Fig. 8). If you're going to refinish the door anyway, you can plug the lock holes with a dowel instead.

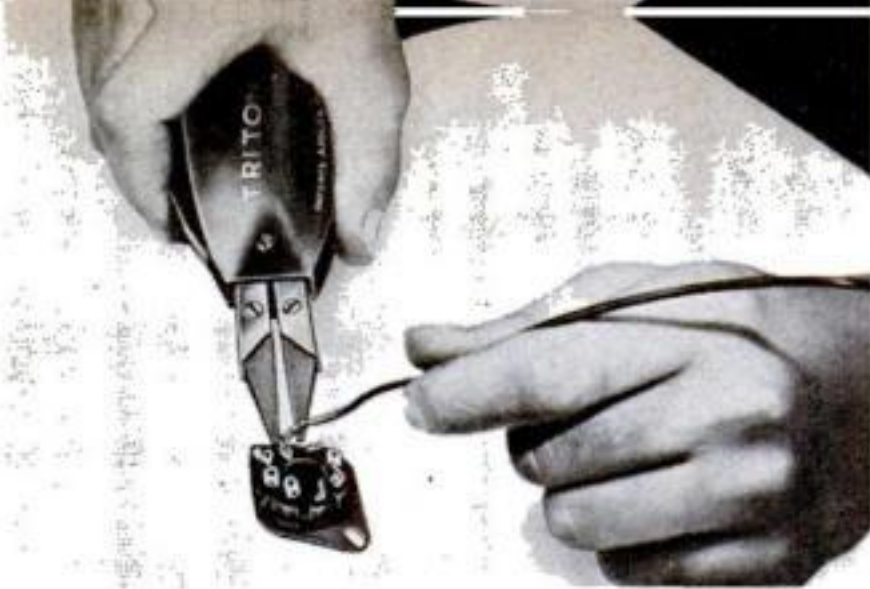
To reverse a common door lock, remove the single screw holding the cover plate. The latch bolt can then be lifted out (take care not to lose the spring) and flipped over so that its bevel will match the new position of the strike plate, which is simply turned over. The door stile is mortised for the lock by boring in from the edge and chiseling out. Bore from the face for the spindle and key. If this is too much of a chore, you can buy a new latch of the type that requires only two holes for installation. **END**

Remove knobs, spindle, and two screws in edge of door. Pull lock out of mortise. Take out screw holding cover plate, and flip over the latch bolt (arrow) to reverse the striking bevel.

Close lock mortise with thin wood. After removing lock escutcheons, plug the round holes with dowel or cover the entire area with a thin wood panel or sheet metal, painted to match.

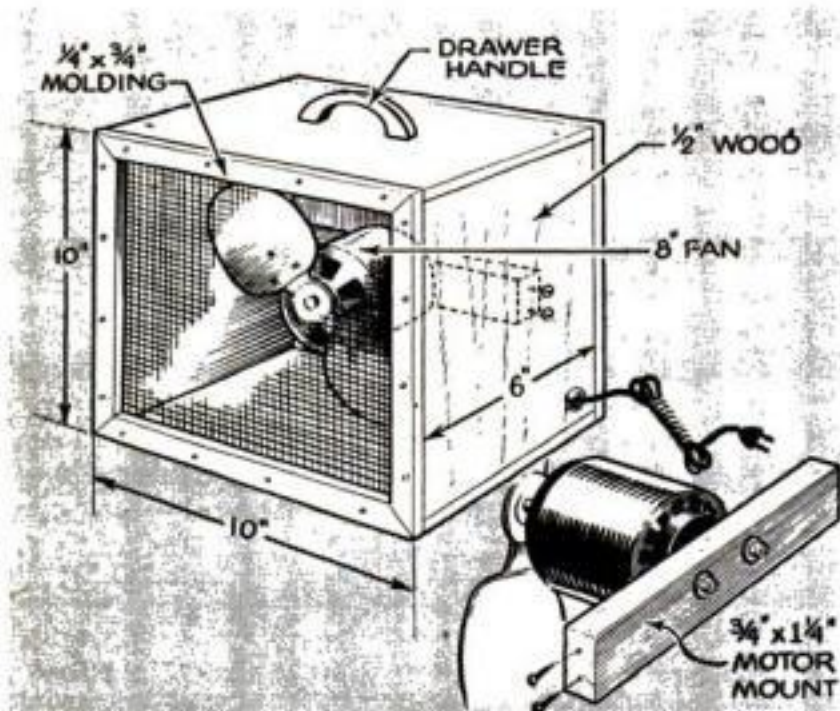
Turn strike plate over to reverse it, and mark out mortise through it. Bore overlapping holes; then chisel square and cut shallow plate mortise. Close old mortise as at right.





Pliers Solder Joint Fast

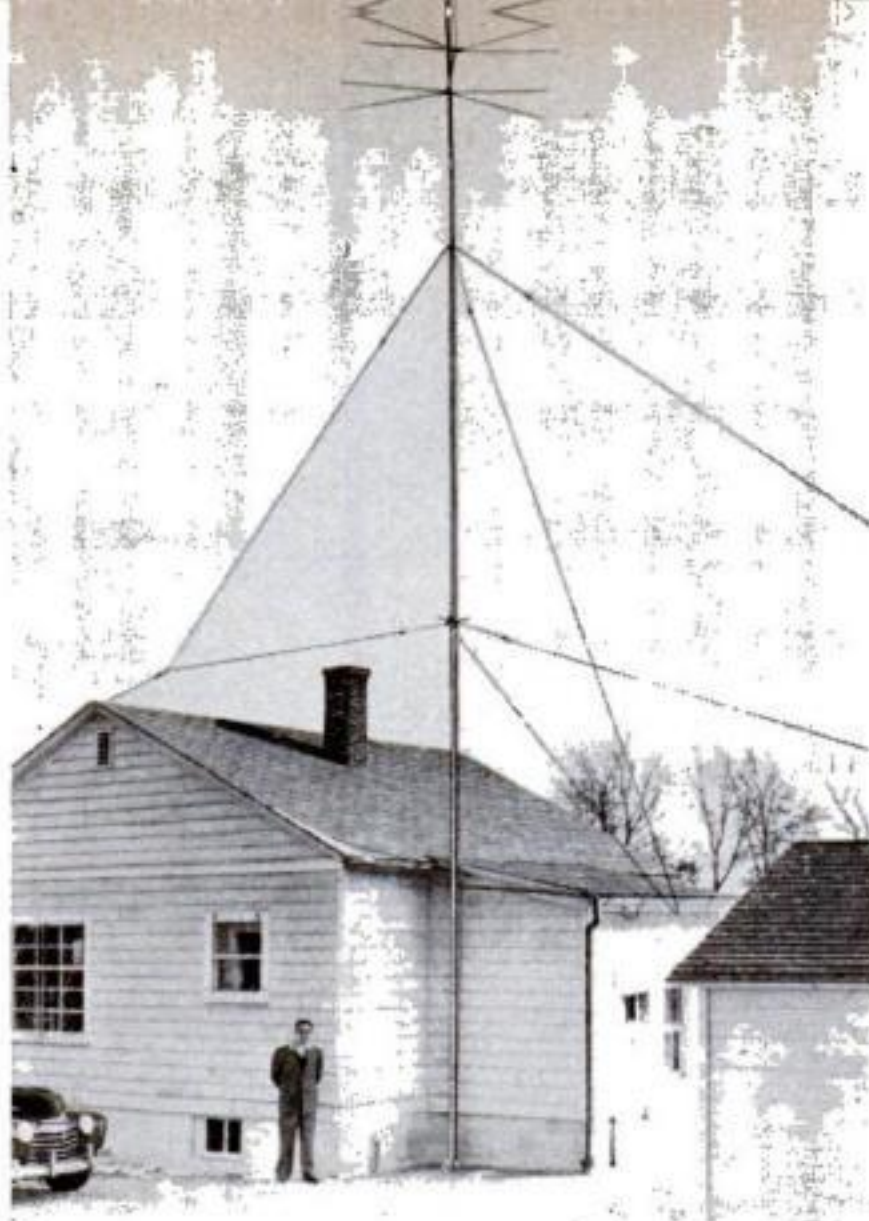
THIS new soldering tool grips parts to be joined, applies heat, and then holds the joint firmly till it's cool. Two carbon jaws grip the work and a pressure switch in the handle turns current on and off. The carbons, connected to a low-voltage transformer, heat up instantly, so an average job can be done in two seconds. The device draws 250 watts while heating, but only 1 watt on stand-by. The Housing Foundation, Inc., New London, Conn., sells it, complete with transformer, for \$22.50.



Fan Made Safe for Children

TO SAFEGUARD our small children, I took our 8" electric fan off its base and boxed it as shown. The case has $\frac{1}{4}$ " mesh hardware cloth on the front and back. For mounting the motor, I took out two long bolts that run through the end bells and substituted still longer ones.

The unit can be used as a window ventilator by placing it on the sill, or as a heat circulator between two rooms in the winter by hanging it in a transom. It's also an ideal fan to carry in the car in warm weather for overnight use on tours, as the blades can't be damaged.—Marion L. Rhodes, Knightstown, Ind.



TV Antenna Mast Jacks Up

A TELESCOPING antenna tower that can be adjusted in height from 20 to 47 feet may simplify TV installations in some fringe areas. The "Jack-Up" tower, made by Camburn Sales & Mfg. Corp., Battle Creek, Mich., is built in three sections and has a jack on top of the lower section that raises the other two. The jack and a release handle can be operated from the ground by cables. The tower can be installed on a roof or placed directly on the ground. It retails for about \$60.

Truck Previews TV Antenna

THIS mobile, truck-mounted antenna gives customers a chance to look before they buy. The truck, containing a 70-foot telescoping mast, is used by Channel Master Corp., of Ellenville, N. Y., to demonstrate its antennas. Often several installations have to be tried in fringe areas before a suitable one is found. The mobile unit makes the tryouts inexpensive.



Your Pocket Can House a 4-tube Radio

Homemade midget superhet will bring in everything on the dial.

By Albert Rowley

YOU don't have to carry your portable radio this summer—you can *wear* it. Here's a homemade receiver that is just about the last word in midgets. It's so small you can slip it into your shirt or trouser pocket and hardly know you have it with you.

You might think that so tiny a set has to be a slipshod, one-tube imitation of a real radio. Not this one. It is a four-tube superheterodyne that will pick up everything on the dial. Headphones reproduce the sound with good tone, fidelity, and volume. Inch for inch and ounce for ounce, this is a good bet in portables.

If you've had a little practice in radio building, you can make yourself a midget receiver just like it. The job does present some rigid space limitations, so it is important that you work carefully and systematically. The first step is to collect all the parts, including the cabinet. Then plan the complete arrangement, and drill all mounting and trimmer-adjustment holes before you solder a single wire.

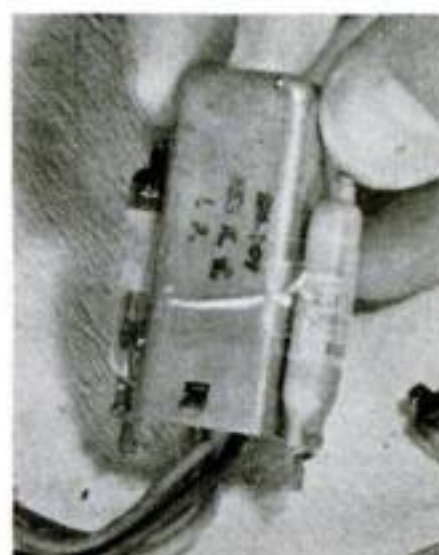
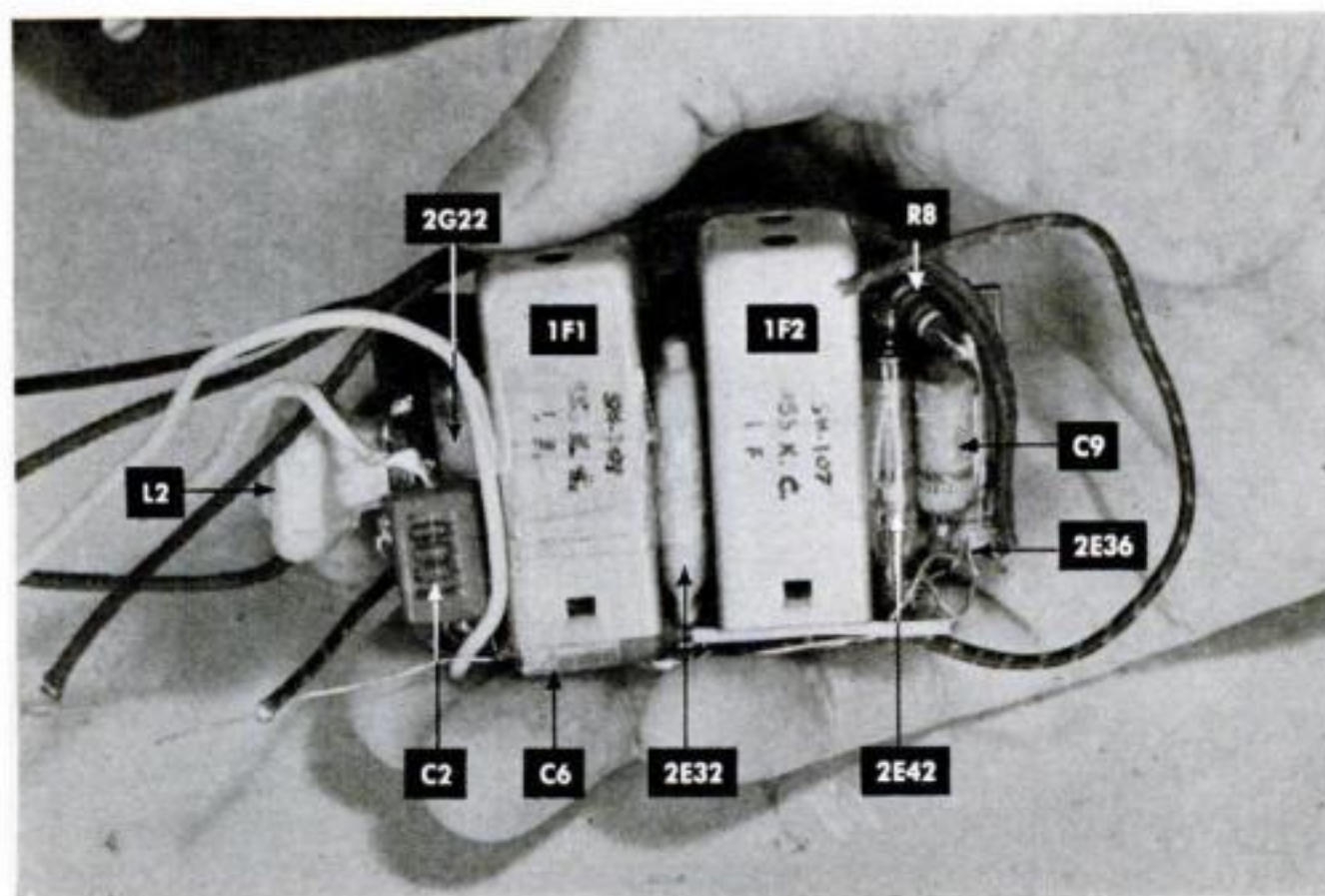


It's light as well as small. Complete with batteries, the set weighs less than 14 ounces.

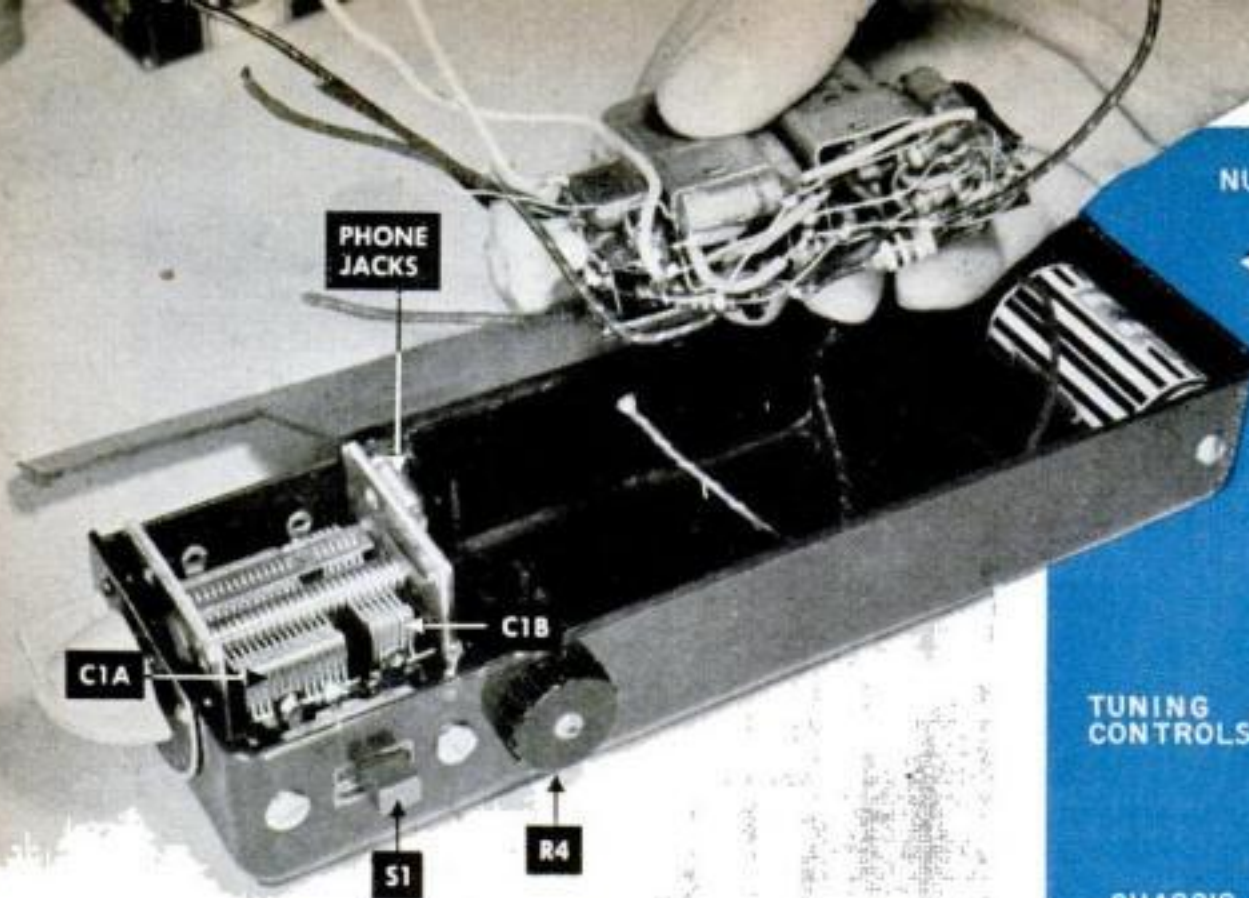
Cabinet: Since the cabinet may determine the arrangement, let's talk about it first. The one shown was made from a plastic dressing-table tray that came from the dime store. It's the kind women use to keep make-up articles separated. Compartments are molded right into the plastic. One three-section strip was sawed off and left-over pieces were used for a cover and mounting strip.

The three tray compartments are perfectly suited to the three-part construction of the receiver. Even if you decide to modify the cabinet you will find it easier to build this set if you work on it by sections.

Section 1—Controls: The top compartment contains the parts that tune and



Tubes are attached to the IF transformers with cellulose tape. Make sure that the prongs clear the sides of the cans. Transformer shield cans must be grounded.



The oscillator coil, at the end of the chassis strip, extends into the top compartment. The wall between is cut away to make room for it.

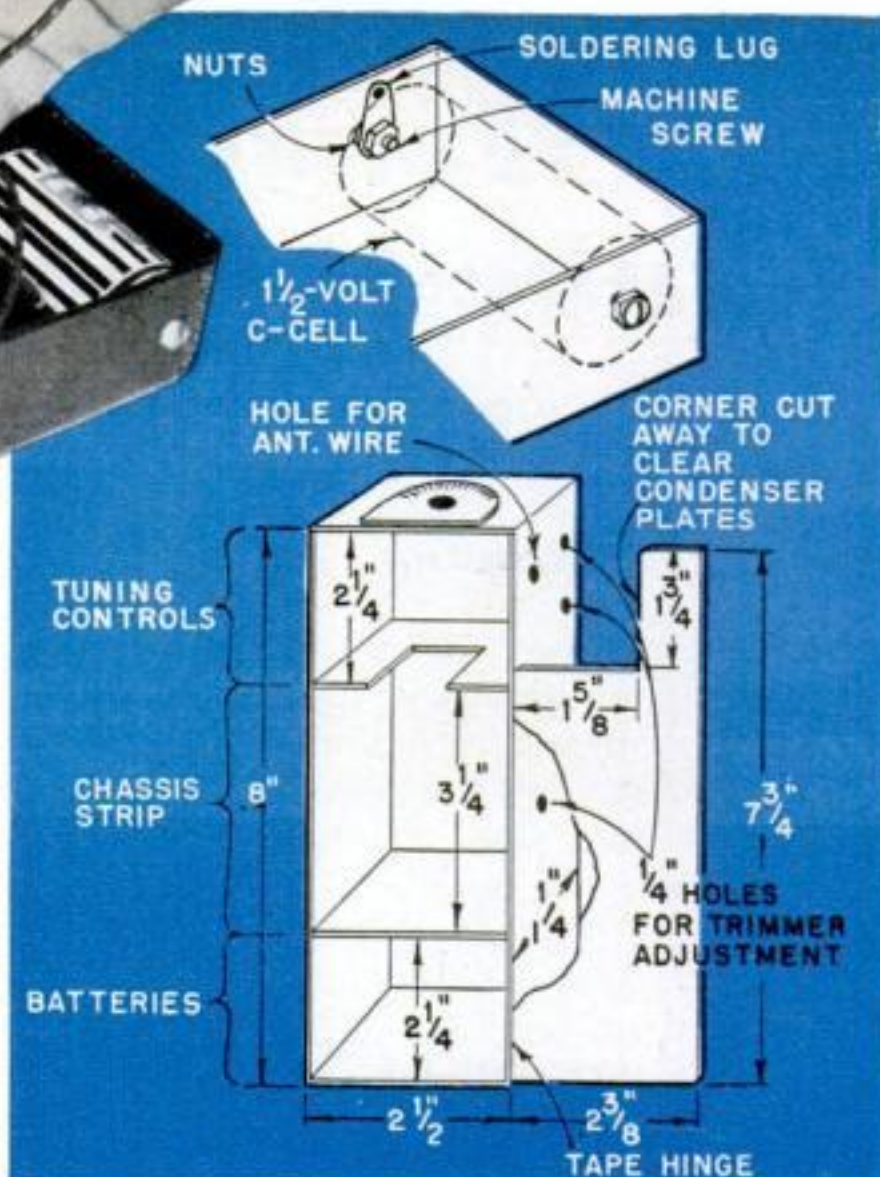
adjust the receiver. They are shown by solid color lines in the diagram. A two-gang variable condenser (C1) is placed so that its tuning shaft protrudes through the top of the cabinet. When the plates are in mesh, the unit fits nicely in the $1\frac{1}{4}$ " cabinet depth. To make room for the plates to swing through the entire tuning range, however, it was necessary to cut away one corner of the cover as shown in the cabinet drawing.

Other parts located in the tuning section are the on-off slide switch, two phone jacks, volume control (R4), and the homemade antenna coil (L1). The volume control is an extremely compact unit made for hearing aids. Its variable-resistor element is enclosed in the knob, so only the three connecting lugs actually go inside the box.

The antenna coil is the only non-standard part in the receiver. To get one small enough, you may have to make it yourself. For the core, use the powdered-iron slug from a standard iron-core antenna coil. Examine any burned-out coils you may have in your junk box, and try to find a slug of the dimensions shown in the sketch.

Wind 125 turns of No. 34 D.C.C. wire around this core. Fit the finished coil between the slide switch and the variable condenser.

Section 2—Chassis Strip: All the tubes and most of the small parts are assembled on a plastic strip that fits into the center compartment. The IF transformers, attached to the strip with self-tapping screws, serve as anchors for the peanut tubes. The 2G22 and 2E32 are taped to the



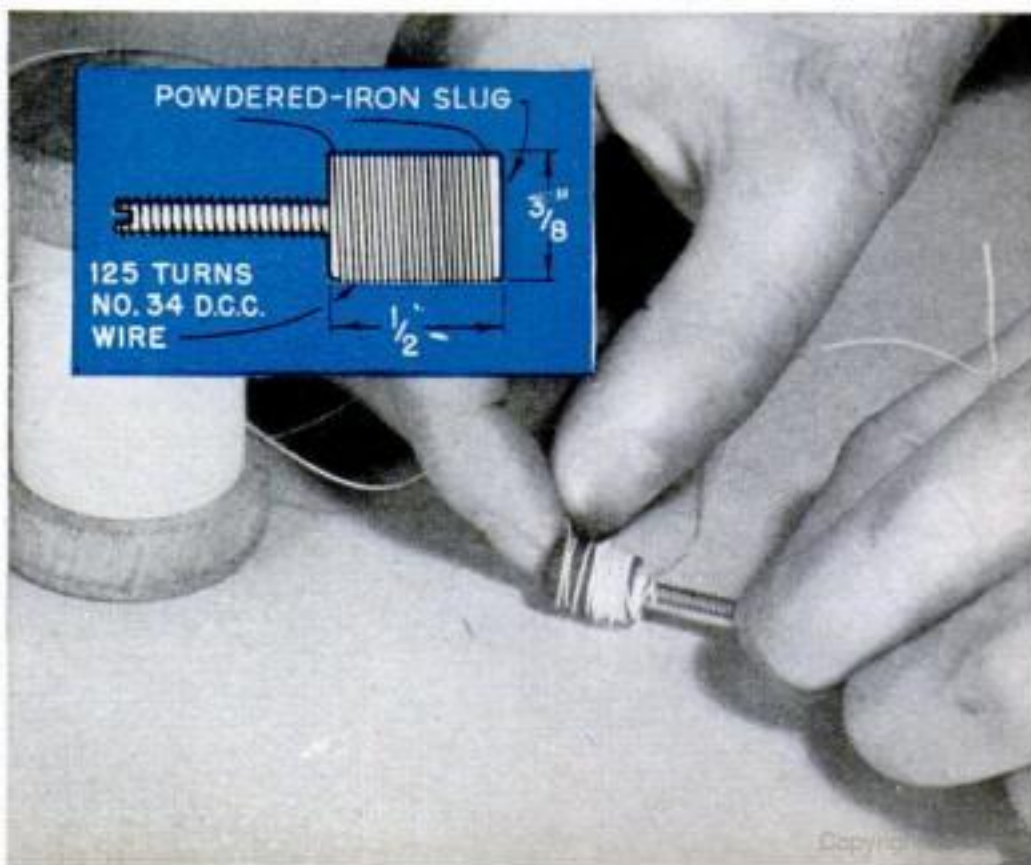
left and right, respectively, of IF1. The 2E42 goes on the right side of IF2.

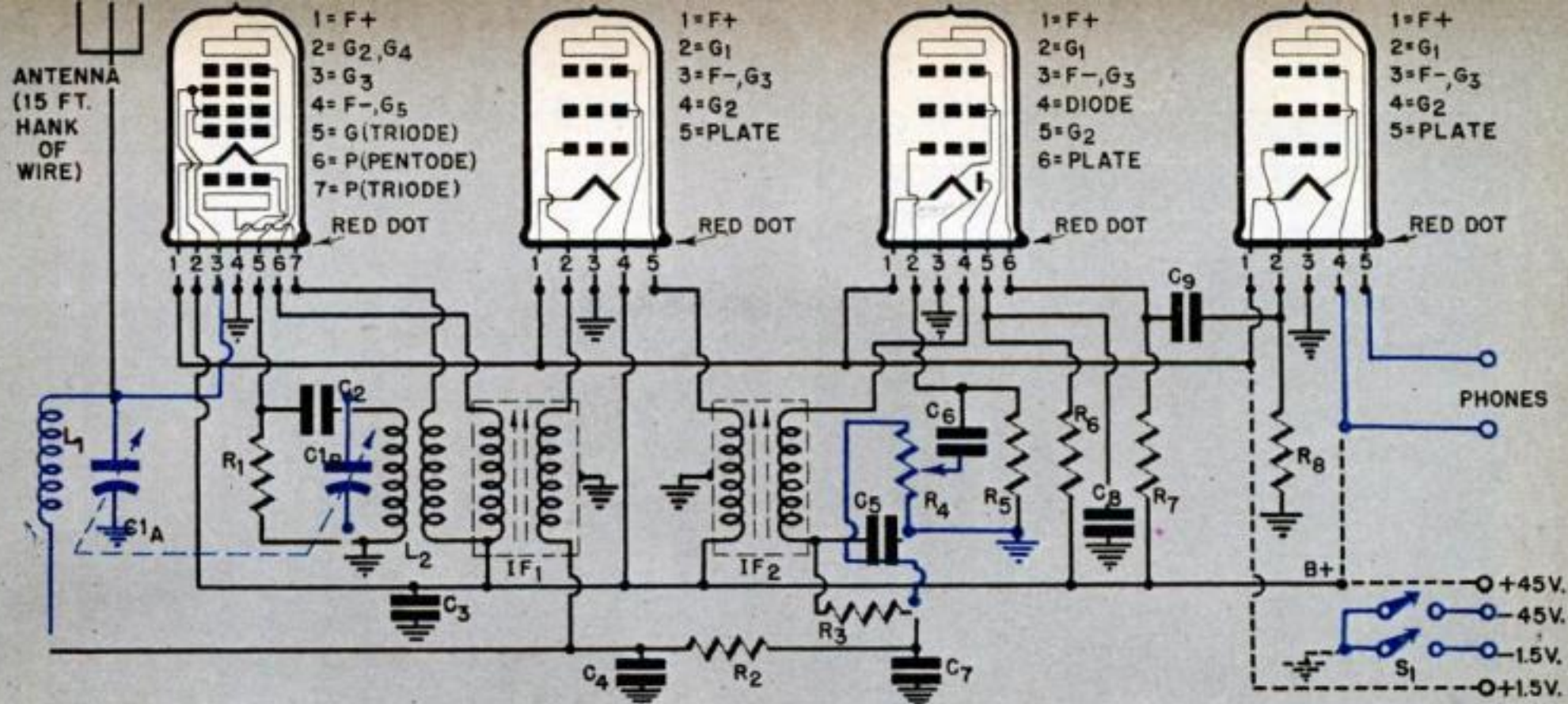
The two other major parts of the chassis strip, the 2E36 output tube and the unshielded oscillator coil, L2, are mounted directly to the plastic.

A small, pencil-size soldering iron will be a big help in wiring the tighter corners. If you don't have one, use a sharp tip in your regular iron. Take it easy with the solder. Some of the connections—especially to tube prongs—are so closely spaced that even a small solder blob may short them out.

Wire all necessary parts and leads to the 2E42, and then go on to the 2E36, the

Wind the antenna coil on a powdered-iron core. Make the windings flat, and seal the coil with dope, nail polish, or cellulose tape.





LIST OF PARTS

All fixed resistors $\frac{1}{4}$ -watt carbon.
 R1: 220,000 ohms.
 R2, R7: 1 meg.
 R3: 47,000 ohms.
 R4: 500,000-ohm hearing-aid-type volume control.
 R5: 10 meg.
 R6: 3.3 meg.

R8: 4.7 meg.
 C1A, B: Two-gang, cut-plate tuning condenser, midget type.
 C2, C5: .0001-mfd. mica.
 C3, C4, C6, C8, C9: .01-mfd., 200-volt midget paper tubular.
 C7: 50-mmfd. mica.
 IF1, IF2: Iron-core intermediate-

frequency transformers for 455 kc. Midget type.
 L1: Antenna coil (see text).
 L2: Unshielded air-core osc. coil, 455 kc.
 S1: DPST midget slide switch.
 Subminiature tubes, 2,000 to 4,000-ohm headphones.

2E32, and 2G22 in that order. Remember that you don't have a metal chassis to act as a common ground, so you'll have to interconnect all grounds just as carefully as you do the B-plus or filament lines.

Section 3—Batteries: You will know you're reaching the home stretch when you come to the battery compartment. This contains two 22½-volt miniature B batteries connected in series and a C-size flashlight cell. Since the small cell has to be changed fairly often, it should be clipped in, rather than soldered. Good clip contacts can be made by driving two $\frac{1}{4}$ " machine screws through opposite sides of the cabinet. Bat-

tery connections are indicated by the broken color lines.

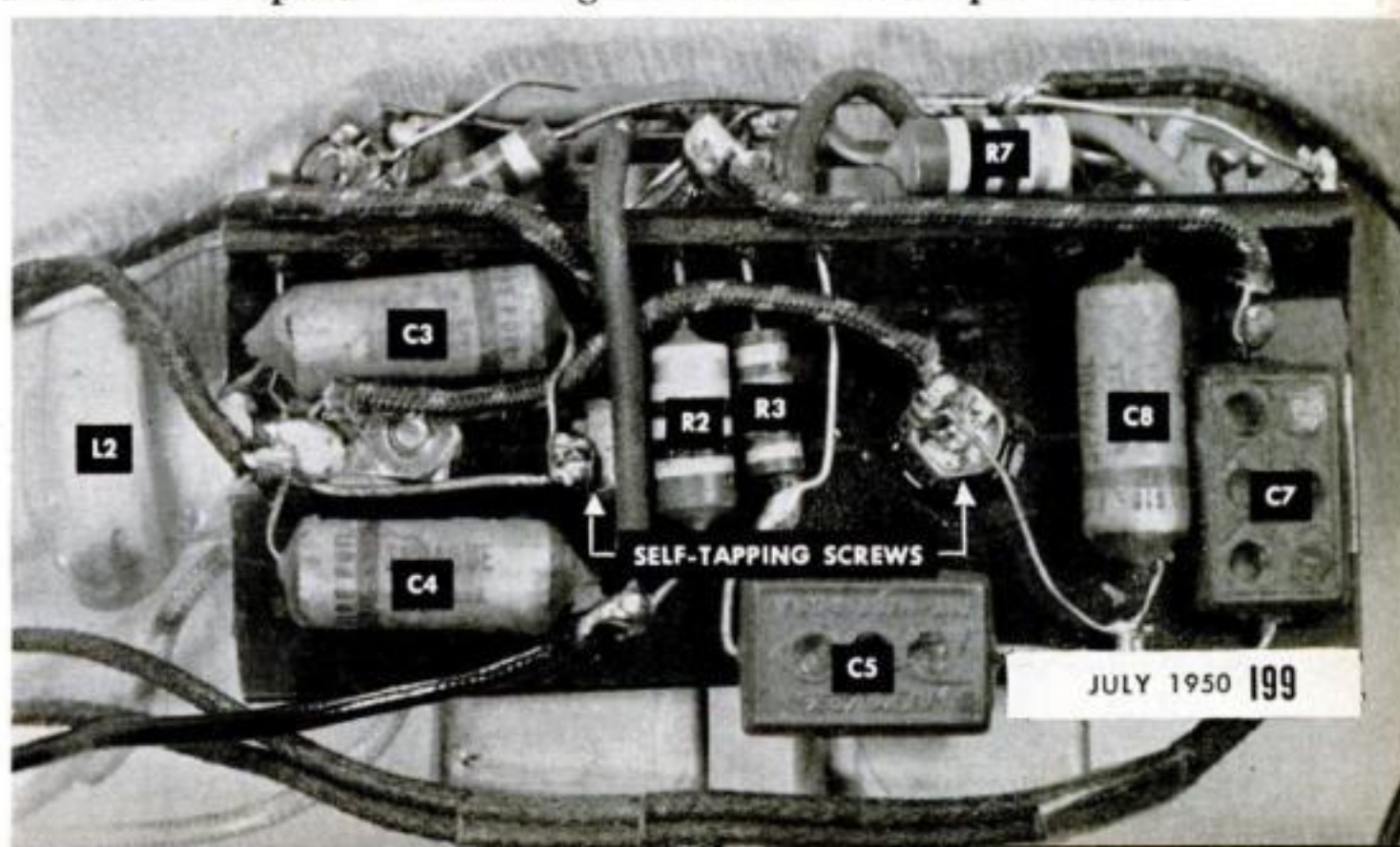
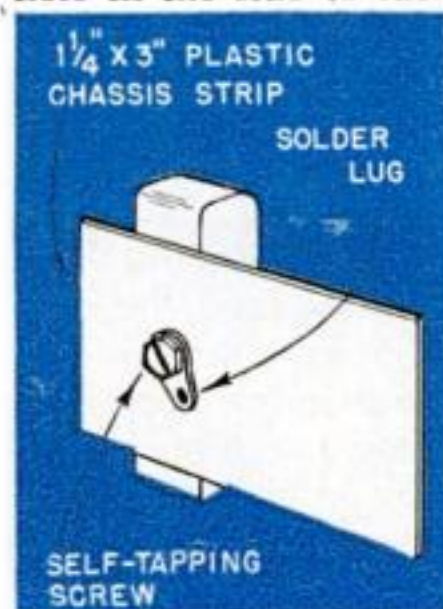
Connecting the sections: The final stage of the wiring consists of running leads between the compartments. Don't forget to link the common points.

You can use any pair of high-impedance earphones to pipe the sound from the radio to your ear. The very compact, single earpiece shown on the opening page is a Telex Earset of 2,000 ohms impedance. If you get one of these, be sure to purchase it with a matching crimped-tip cord for use with phone tips; the plug-tipped cord isn't suitable.

END

Remove the IF transformers from their cans by pushing back the retaining clips. Drill a small hole in the side of each can and a correspond-

ing hole in the plastic strip. Attach transformers with self-tapping screws. Screw heads and solder lugs can be seen in the photo below.

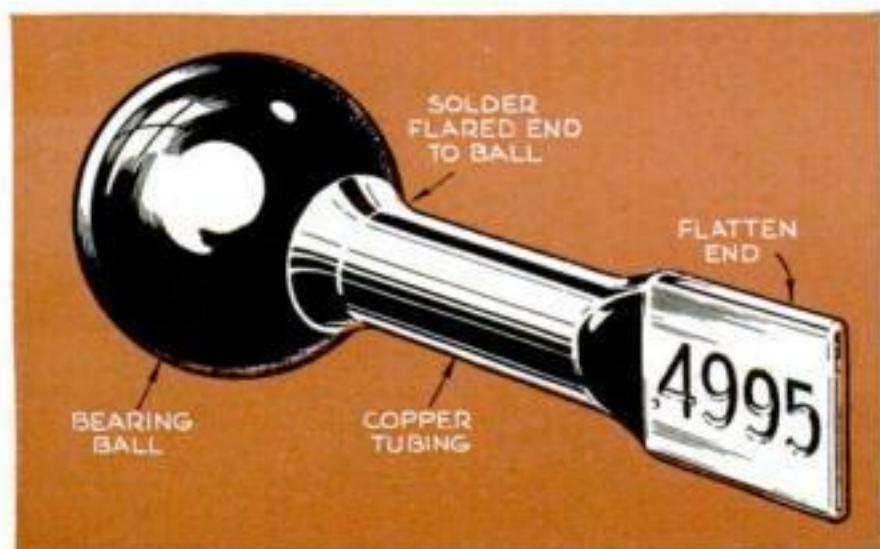




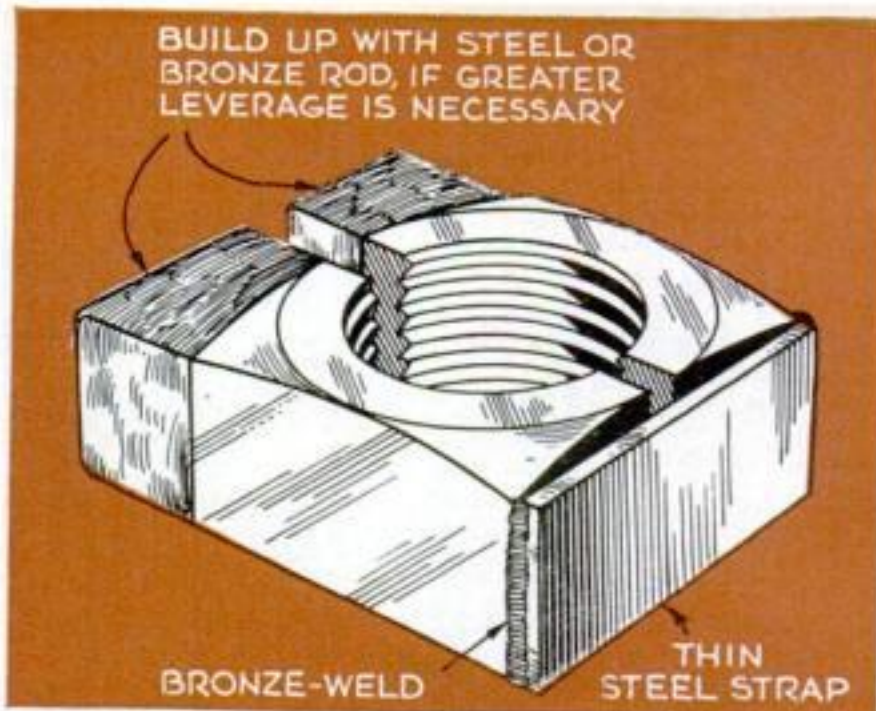
NEW SHOP IDEAS



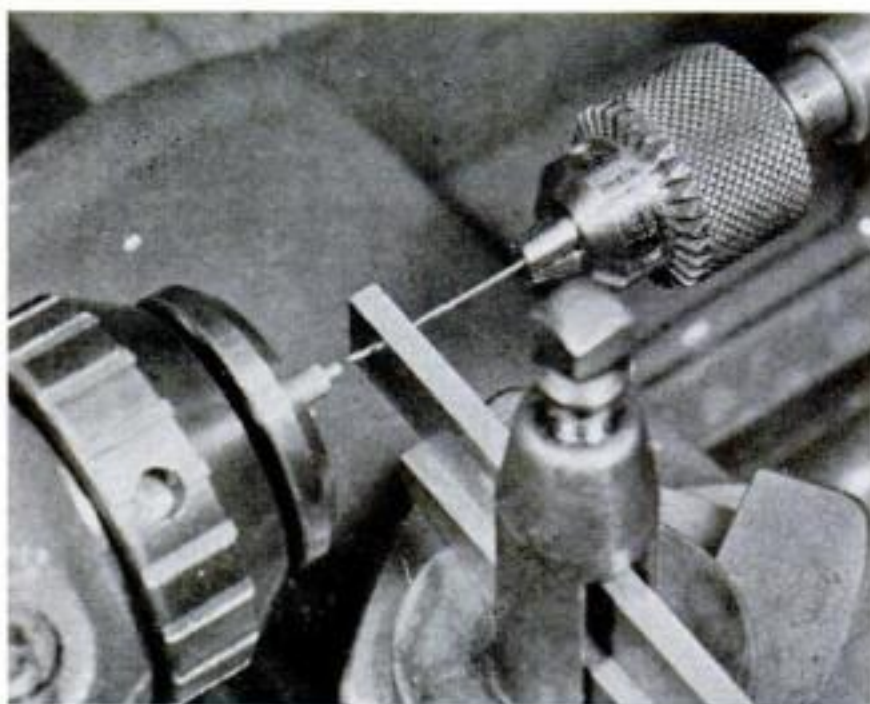
Bushing Centers Drill. If you've ever spoiled a job by getting a hole off center in a shaft, you'll appreciate this trick. Braze or silver-solder a boss alongside the top of a V-block clamp. Carefully fasten the block on the drill-press table with its V centered exactly under the spindle. Tighten the clamp on a piece of stock and drill through the boss for a bushing. You can make several bushings for various drill sizes, or use just one to spot the hole, changing afterward to a drill of the desired size.—*Floyd R. McGuckin, Ridgewood, N. J.*



Ball Forms Plug Gauge. Steel bearing balls can be had in many sizes, and since they're ground to very accurate dimensions, I've found they make good plug gauges. I flare a piece of copper tubing to fit onto the ball, and soft-solder the ball to it. Then I flatten the other end of the tubing and stamp the size of the gauge on that.—*Robert J. Hood, Ashland, Ohio.*

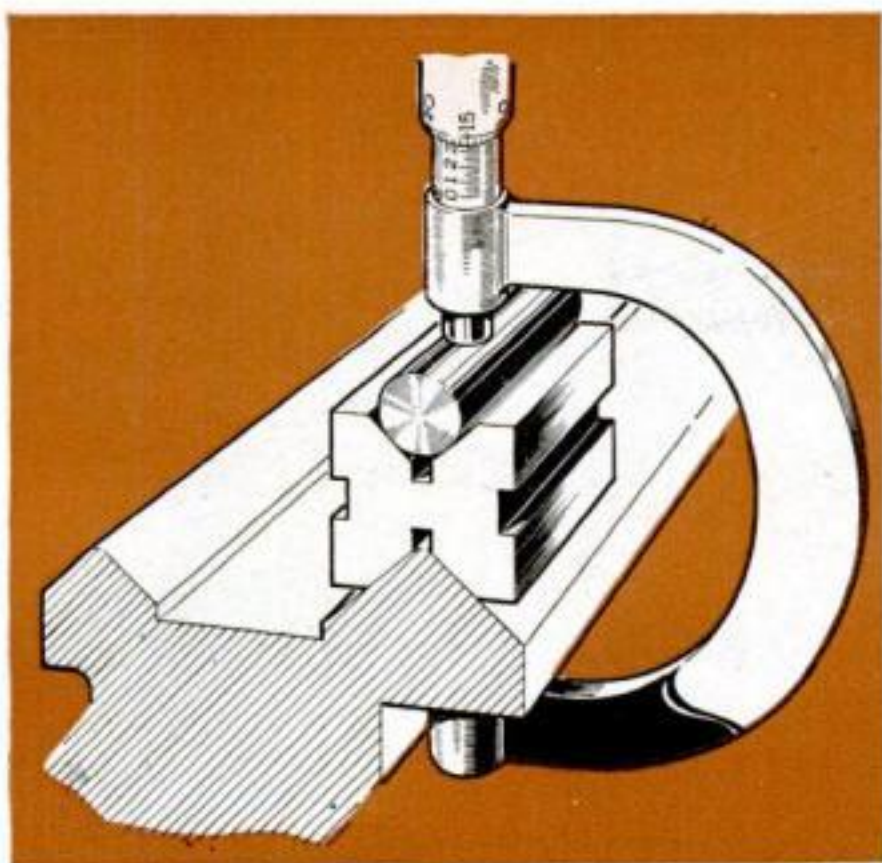


Split Nut Yanks Studs. This "persuader," shown in *Oxy-Acetylene Tips*, a Linde Air Products Co. publication, removes studs from castings without harming the threads. Saw in half a nut that fits the studs, separate the halves by the thickness of the hacksaw blade, and braze a 1/16" steel strap across two outside corners. Screw the nut on the stud and grip it with a pipe wrench. The nut halves will bind and turn the stud out. For stubborn jobs, weld on extra metal opposite the strap as shown.

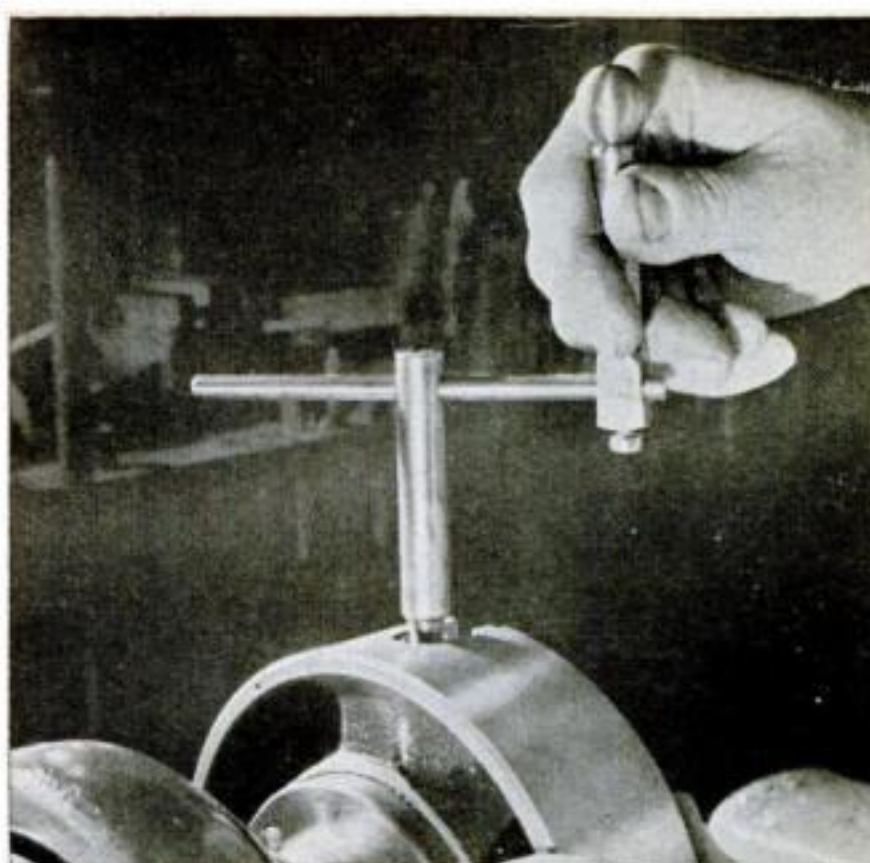


Guiding Small Drills. Holes in the Nos. 60 to 80 range are hard to drill true in the lathe because the tiny drills lack stiffness. But this method does the trick.

Grip the drill as short as possible in a headstock chuck. Clamp a piece of bar stock in the tool holder; then feed the carriage against the drill to make a hole in this piece. Being careful not to move the cross feed, put the drill in a tailstock chuck and the work in a headstock chuck or collet. Place the pierced bar near the work, and feed the drill through it to make the hole.—*J. C. Magee, Schenectady, N. Y.*



V Block Checks Lathe Wear. To measure the wear on the ways of a lathe, place a V block on one way and a short dowel pin or other true round piece in the upper groove. Take a micrometer reading at the extreme right-hand end, and subsequent ones 2" apart up to the headstock. The variation in readings is the wear at the different check points along the ways.—*Jesse R. Lucas, Michigan City, Ind.*

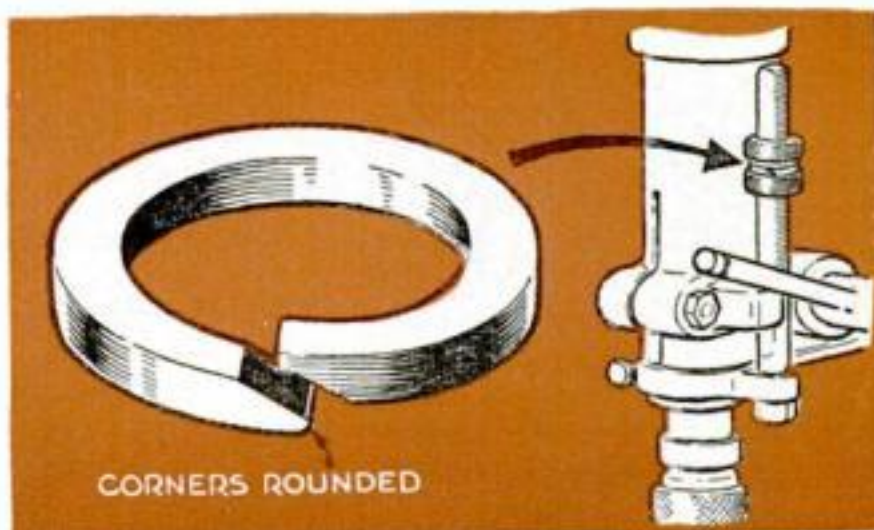


Crank Speeds Chuck Use. When reversing chuck jaws, you can save time with a key crank made from a big carriage bolt. Saw off the head, drill through the square end for the cross pin of the chuck key, and tap for a setscrew. Turn a suitable ball, or chuck an annealed bearing ball and drill a 3/16" hole through. Shoulder down the threaded end of the bolt to a drive fit in the ball.—*Joseph Tracy, Manhattan, N. Y.*



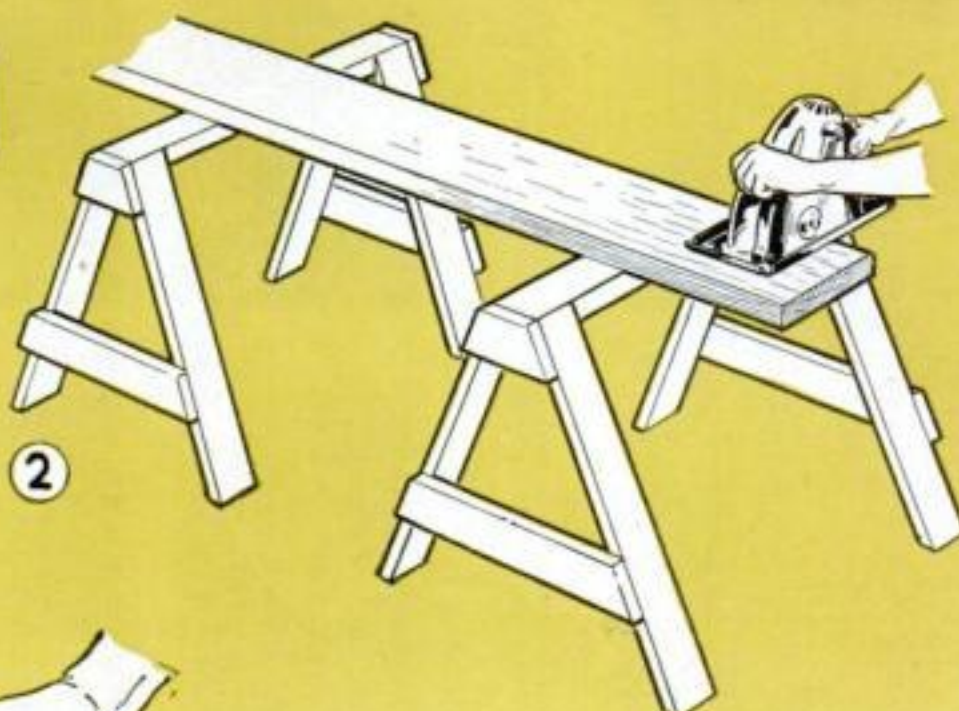
Clamp for Drilling. With this device on the drill press, you won't be tempted to hold work by hand because you're in a hurry or C clamps won't fit. It consists of two hardwood strips joined by carriage bolts. With it, flat stock of any kind can be accurately located and quickly secured. It's also handy as a stop against which to hold a drill-press vise, or a fence for routing or planing.—*H. L. Campbell, Oak Park, Ill.*

Flatiron Tempers Tools. After hardening small pins, punches, and other parts with a gas flame in our shop, we lay an old electric iron upside down and set its thermostat at 550°. We then put the hardened pieces on the sole of the iron, turning them slowly until the desired quenching color appears.—*G. R. Wyatt, Dover, N. H.*



Washer Locks Depth Nuts. The depth stop nuts on my drill press often loosened after I had drilled a few holes. To end this nuisance, I ground off the sharp corners of a lock washer and put it between the two thumb nuts, which now stay locked.—*F. E. Riley, London, England.*

WHAT'S WRONG ?



Good tools are a short cut to good work, but some handy men discover short cuts the tool manufacturers never intended. What's wrong here from a safety standpoint?

1. Drilling blind holes in a screen frame this way saves clearing off the workbench. 2. A portable electric saw quickly trims planks. 3. Husky tin snips will cut fairly heavy metal if braced against the bench top. 4. The rip fence is handy as a gauge stop for cutting short pieces to identical size. 5. Pliers keep sheet metal from turning under the drill. 6. A shaft is smoothed by lathe filing.

Answers

1. The drill may skin the thumb, and may run through into the fingers behind.

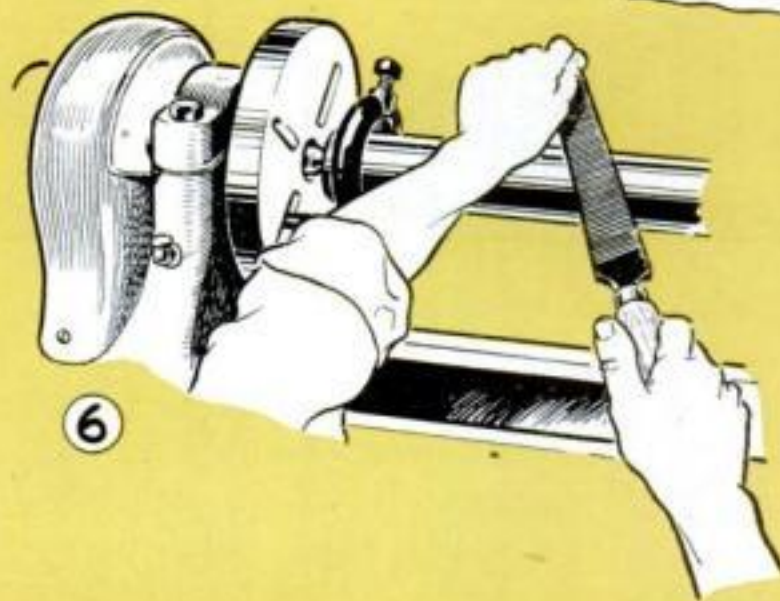
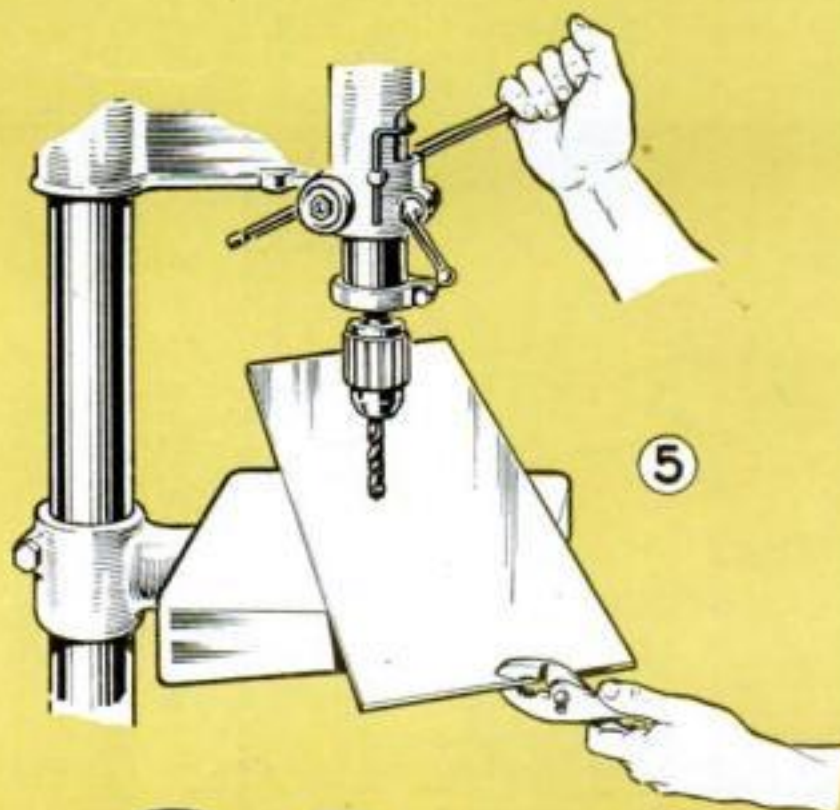
2. Since the plank is free to slide, the least that can happen is a crooked cut, the worst a dangerous slip of the saw. Clamp the plank.

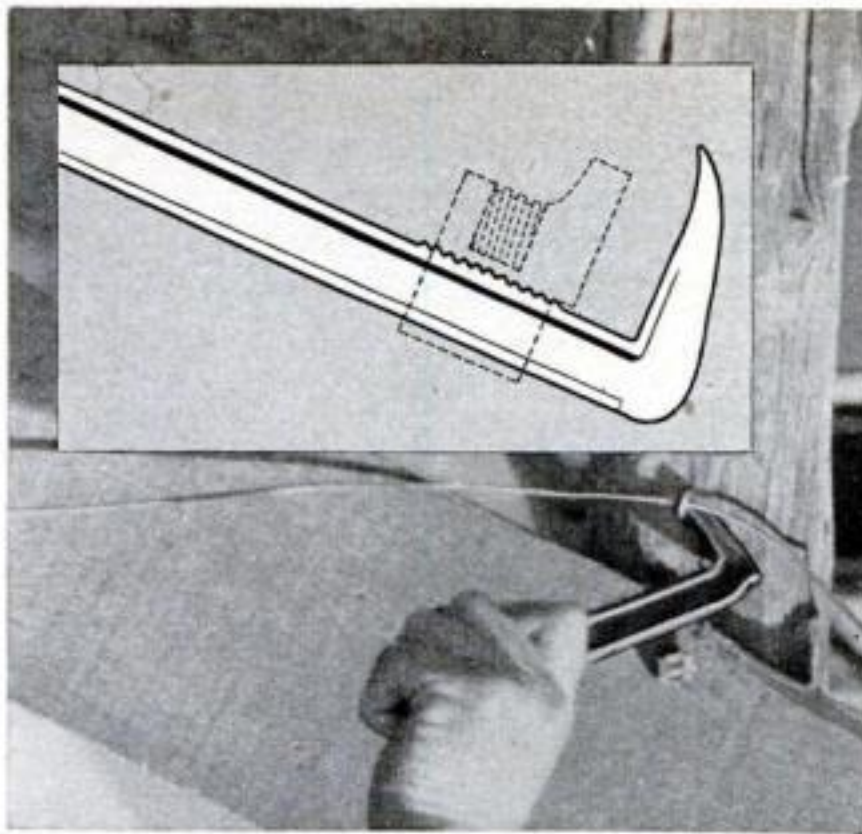
3. As the blades snap through the stock, knuckles will be pinched between the handles. Keep fingers inside the handle eye.

4. Pieces may jam between blade and fence. Use a stop that doesn't go as far back as the blade.

5. The big drill will grab sheet metal and yank it free. Riding up on the drill, it may whirl around dangerously. Clamp it down.

6. The whirling lathe dog may smack your left wrist or elbow. File left-handed on the lathe.



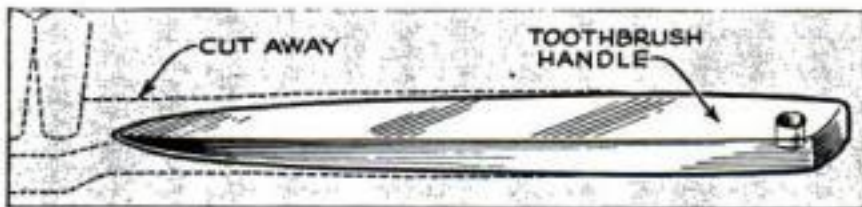


Wrench Is Staple Puller

A STRONG, simple, and long-lasting staple puller can be made by removing the movable jaw from the type of monkey wrench shown and drawing the tip of the fixed jaw out to a point. The point is driven through the staple and the handle used as a lever to extract it. The tool will stand rugged use. —E. V. Reyner, Townsend, Montana.

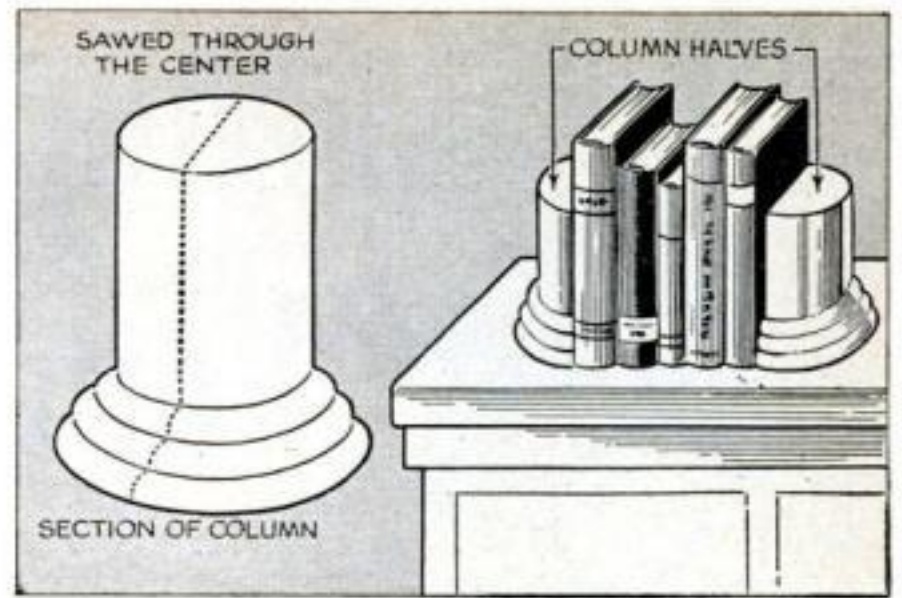
Tweezers for Splinters

BETTER than the usual needle for nabbing splinters is a pair of stamp tweezers with the ends ground and honed to fine points. Keep the tweezers with a bottle of antiseptic by a rubber band. —Robert Hertzberg, Jackson Heights, N. Y.



Plastic Needle Sews Burlap

THE handle of an old toothbrush, when cut to a point, makes an excellent needle for sewing burlap and other such coarse-weave material. You can put a point on the handle with a coarse grindstone, coarse paper on a belt or disk sander, or a medium file. To make the eye, heat up the point of an ice pick or nail and bore through. —Mrs. W. P. Blissitt, Cedartown, Ga.

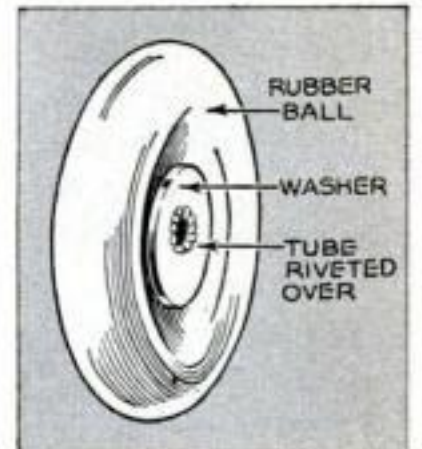


Book Ends Made of Old Column

A BASE section from a dismantled colonnade or porch column makes an attractive set of book ends when sawed in two. A thorough sanding and application of a stain and varnish produce a piece of work that will appear to be a lathe project, yet you will have done the job quickly and with little effort. Depending on the column you get, you may wish to fit filler blocks in the top, add sheet-metal bases, and weight the halves with lead. —Victor H. Lamoy, Upper Jay, N. Y.

Balloon Tires for Toys

BALLOON-TIRED wheels for toys and models are easily made from hollow rubber balls. Bore a hole through the ball, place two large washers on opposite sides of the hole, and insert a short metal tube in the opening. Press the washers together to get the desired wheel shape and thickness and expand the ends of the tube with a punch and hammer. Rivet over the tube ends to grip the washers securely. —Frank Shore, Manhattan, N. Y.



Press the washers together to get the desired wheel shape and thickness and expand the ends of the tube with a punch and hammer. Rivet over the tube ends to grip the washers securely. —Frank Shore, Manhattan, N. Y.

Save Acid in Solder Core

BEFORE putting away a roll of acid-core solder, pinch the end of it with a pair of pliers. This seals it off and prevents the flux from leaking out. It makes a roll last longer and do better work. —Virginia Hanson, Santa Monica, Calif.



Choosing Your Bearings

By **Walter E. Burton**

WHEREVER things turn, you need bearings. Whether you're building a weather vane, a drag saw, or an HO-gauge locomotive, you must provide something for shafts to turn in. It may be nothing but a hole in a piece of wood, or you may need a tiny, precision ball bearing $\frac{1}{8}$ " across the outside. Both kinds, and many others in between, have their place.

Wooden bearings. These aren't outdated by any means, and will carry surprising loads. Big thrust bearings that take the push of ships' propellers are still made of lignum vitae, the hardest wood known.

You can make good wooden bearings from maple or other hard, close-grained wood. Bore the hole a close running fit for the shaft, across the grain. If you want to

A small maple block forms both standard and bearing for this little film winder. Wooden bearings will do for much heavier duty than this if well made and thoroughly lubricated.

take up for wear, saw from one edge to the hole and drill across this kerf for one or more take-up bolts, as in Fig. 1. Use washers under the boltheads and nuts. Soak the bearing in oil or hot grease.

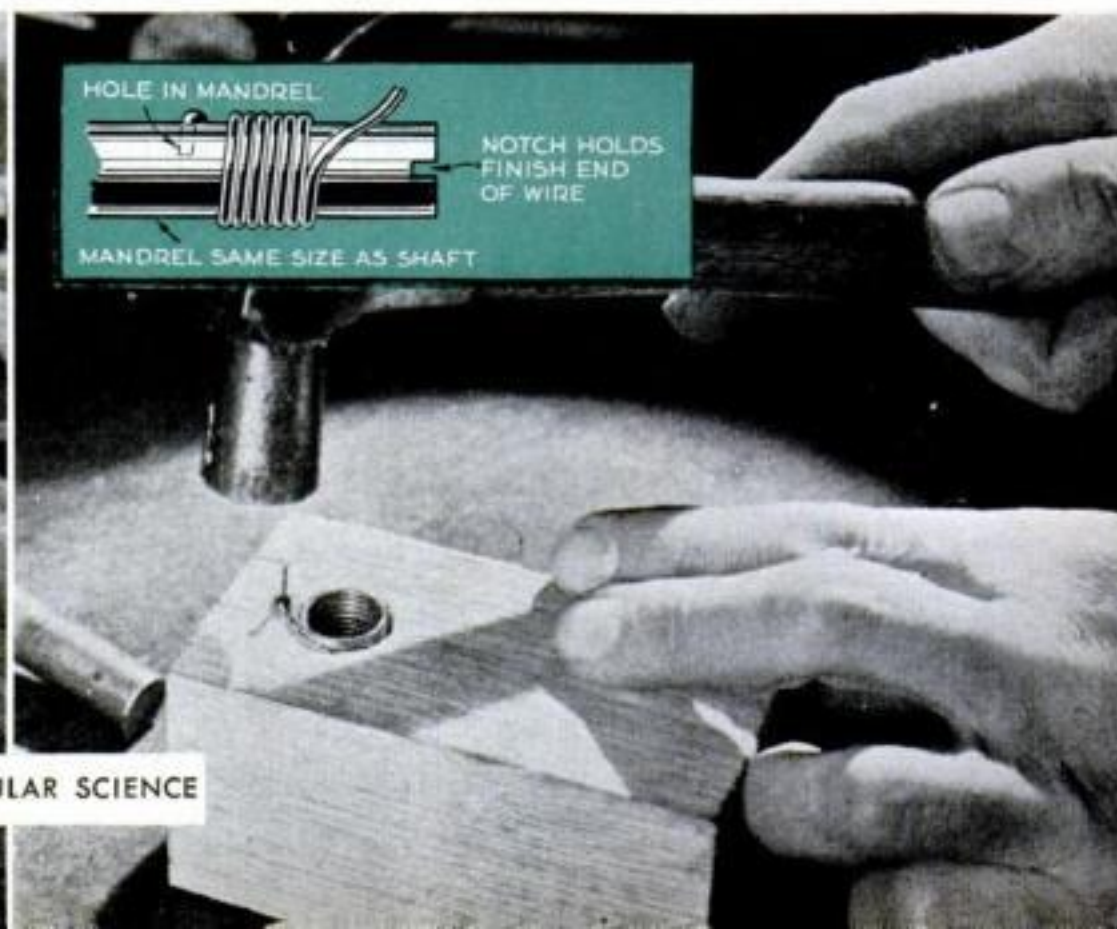
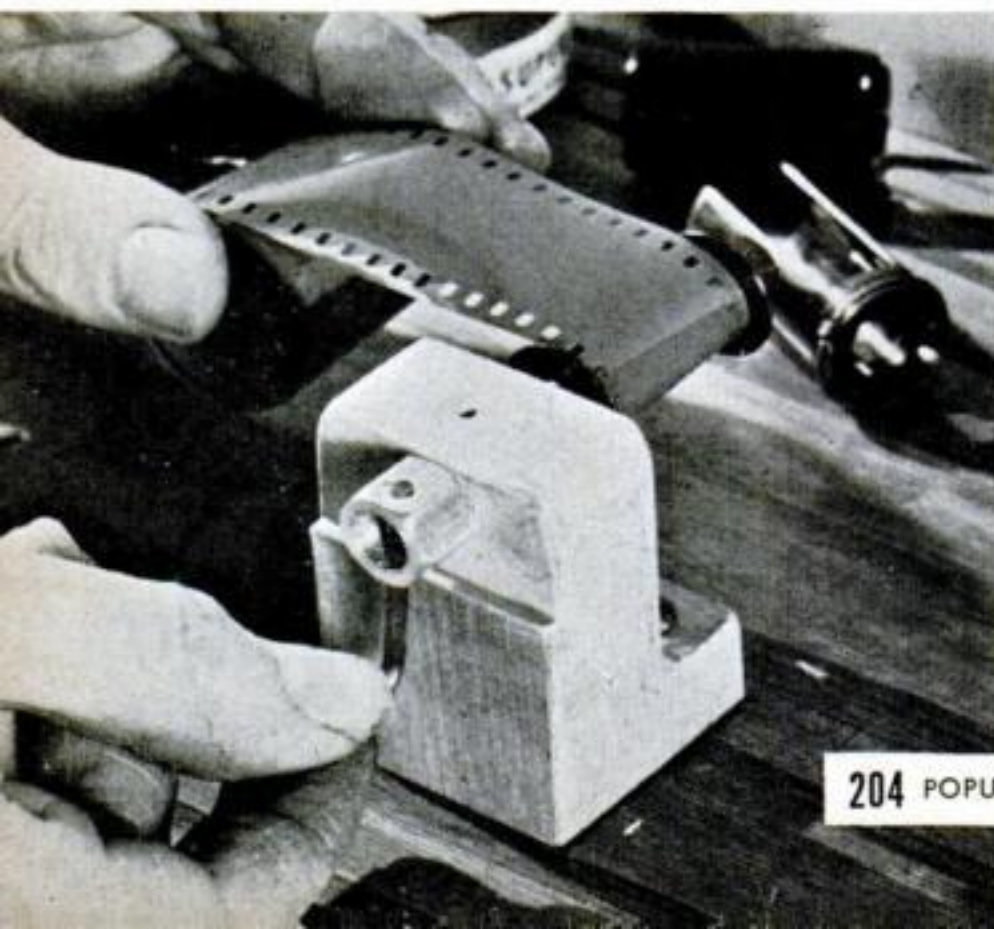
Lined bearings. A durable bearing can be made in a softwood block by lining an oversize hole with a bushing, which may be a piece of pipe or tubing, or a wire coil. To form a wire bushing, wind brass, copper, or bronze wire on a rod or mandrel the same diameter as the shaft, or even on the shaft itself. Holding the turns tightly together, solder them on the outside. Remove the coil and push it into a hole bored in the wood. Wire bushings should be made extra long, as the load lies tangent to the wire and the bearing area is small. Large sleeves can be wound undersize and reamed to shaft size for more bearing area.

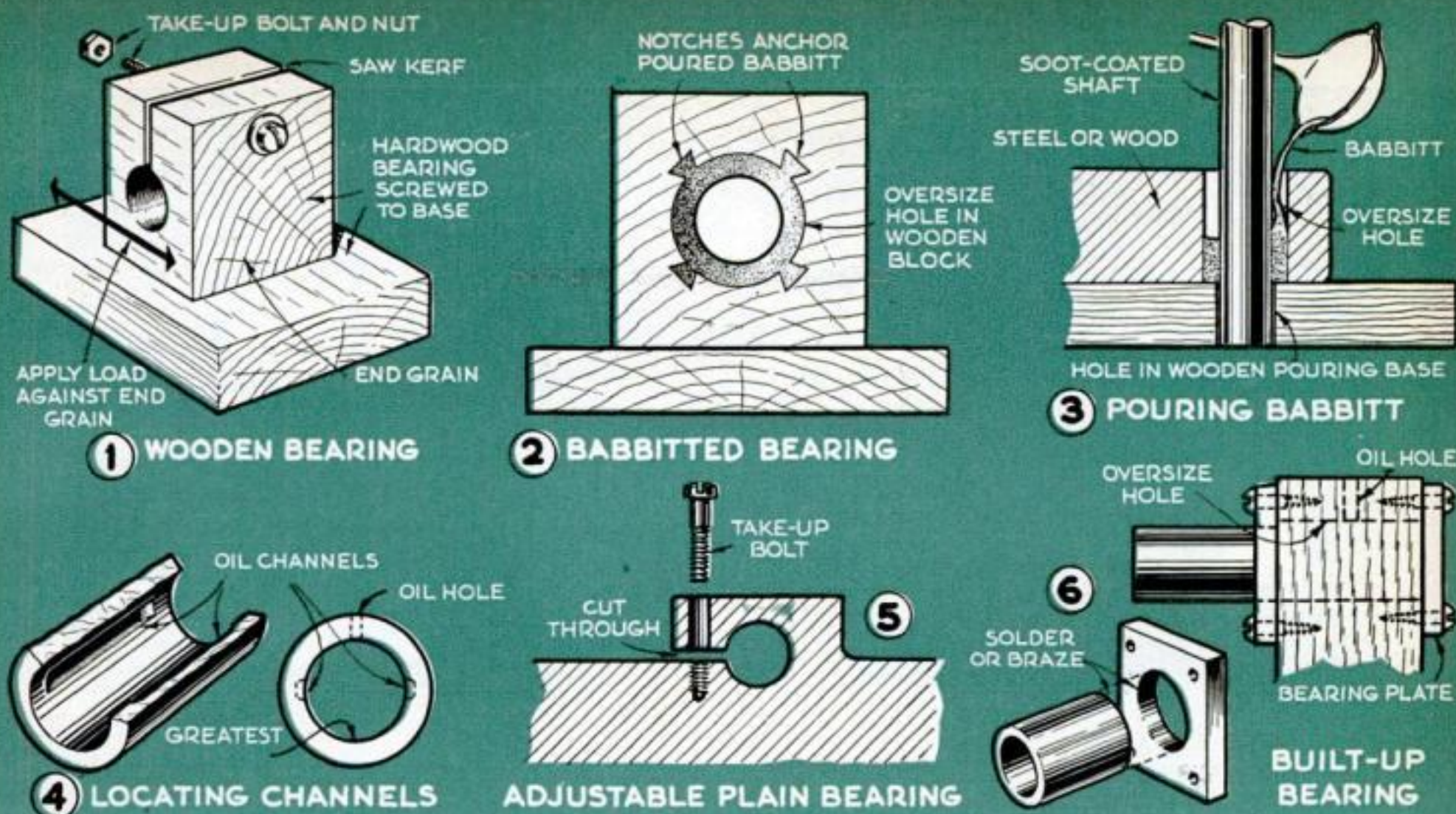
A similar liner can be made by winding wire solder on the shaft, and simply fusing the turns together with a hot iron.

Babbitt, a lead-tin alloy, has long been used to line bearings, and is easily poured in the home shop. To make a babbitted bearing in a wooden block, bore the hole considerably larger than the shaft, and cut or file anchor slots for the metal (Fig. 2).

Babbitt can be poured right around the shaft, so forming a bearing of the right size, but you have to hold the shaft properly lined up in the hole, and keep the poured metal from flowing out at the ends. The easiest way to do this is to pour the bearing in a vertical position as shown in Fig. 3. Heat the shaft a bit hotter than boiling water to prevent rapid chilling of the molten metal. Some mechanics coat the shaft with chalk or graphite for easier removal, or

Wire liners for wooden bearings can be made by winding wire on a mandrel or the shaft itself. Turns are soldered together. If liner isn't tight in the hole, tack wire ends fast.





apply oil and smoke the oiled surface.

After pouring the bearing, carefully work out the shaft and clean it. Drill oil holes and, in long bearings, gouge oil channels where the load is lightest (Fig. 4).

You can cast babbitt in a metal shell or housing the same way, but instead of cutting anchor notches, simply tin the inside of the bore with solder so that the babbitt will bond with it. In aluminum or other metal to which solder won't cling, cut coarse threads or slots to anchor the lining.

Solid bushings. Bronze bearing sleeves, or bushings, can be bought in a variety of kinds and sizes. You can also buy bronze bearing stock for machining your own. Self-lubricating bearings, which need no oil, are usually porous in structure and saturated with lubricant. Split or slotted sleeves are used for adjustable bearings.

Some sleeves have flanges, grooves, or pins to hold them in place, but most of them are pressed in. If a sleeve is a trifle under-size for a press fit, it can sometimes be made to serve by tinning the outside with solder. Pressing in a thin-walled sleeve may reduce its outside diameter so that the shaft won't fit. The answer, of course, is to ream it to size *after* it's installed. If a bearing consists of two sleeves some distance apart, they should be line-reamed, that is, a long reamer should be run through both at once.

Sometimes a tight sleeve can be inserted by heating the housing to expand its diam-

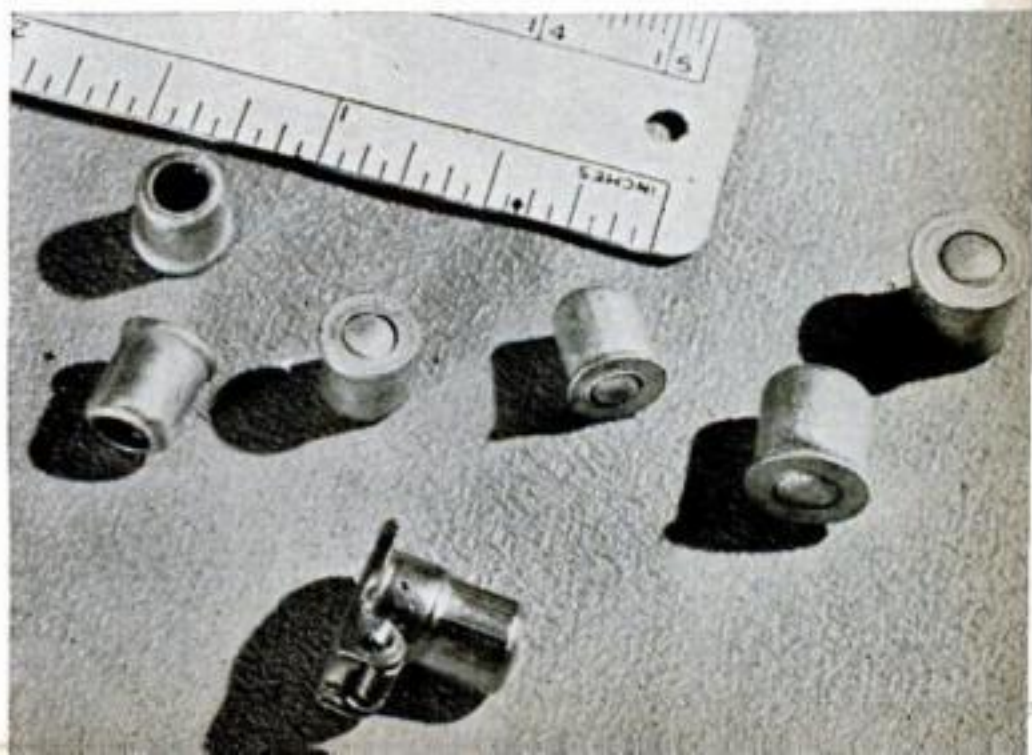
eter. Or you can shrink the sleeve itself by chilling it in a refrigerator or with dry ice.

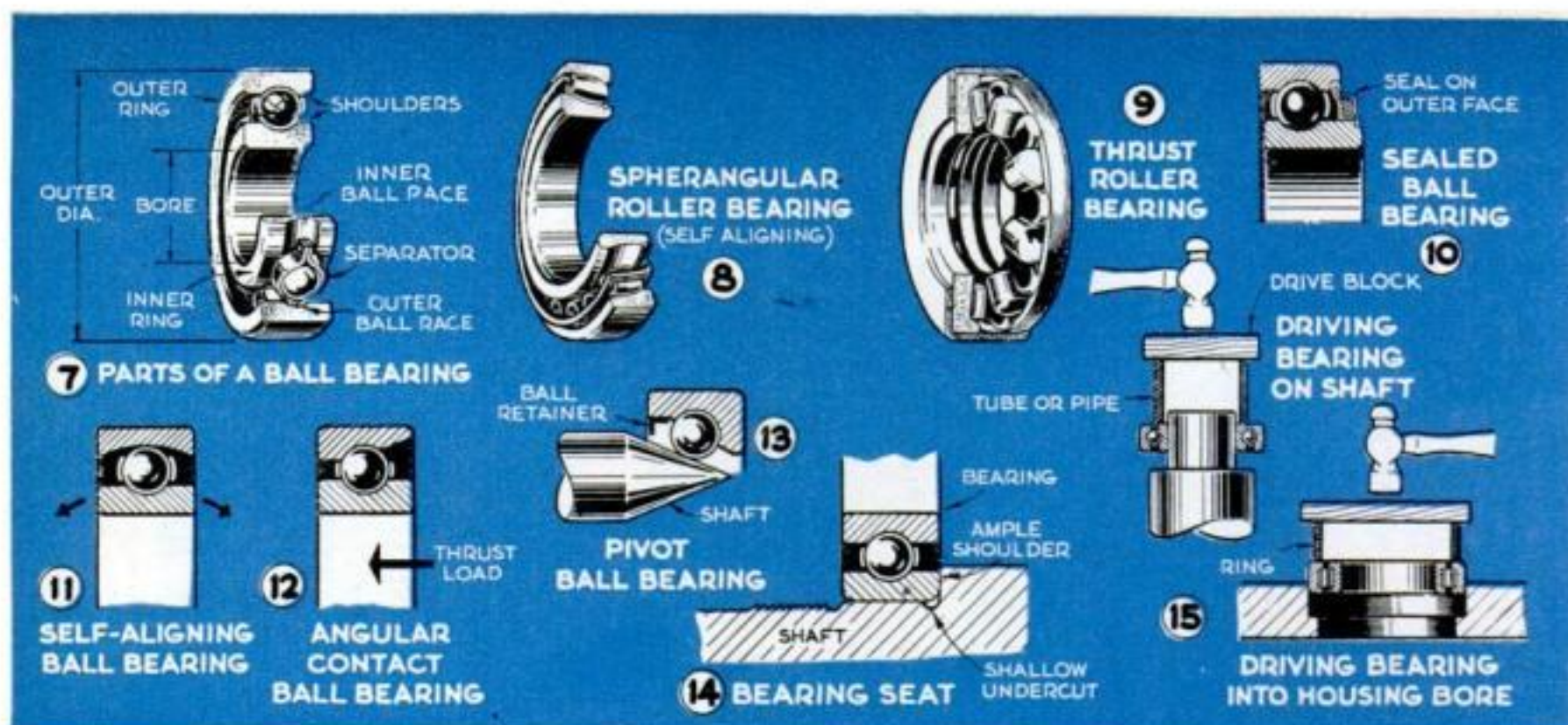
In machining your own bushings, try to turn the outside and drill or bore the inside at the same chucking, or else bore the inside and mount the bushing on a true-running mandrel to assure concentricity.

Plain bearings. A clean, true hole in

Babbitt bearing is poured in a metal housing around the soot-coated shaft. Charcoal sprinkled over molten metal helps minimize formation of dross. Shaft is preheated to 250°.

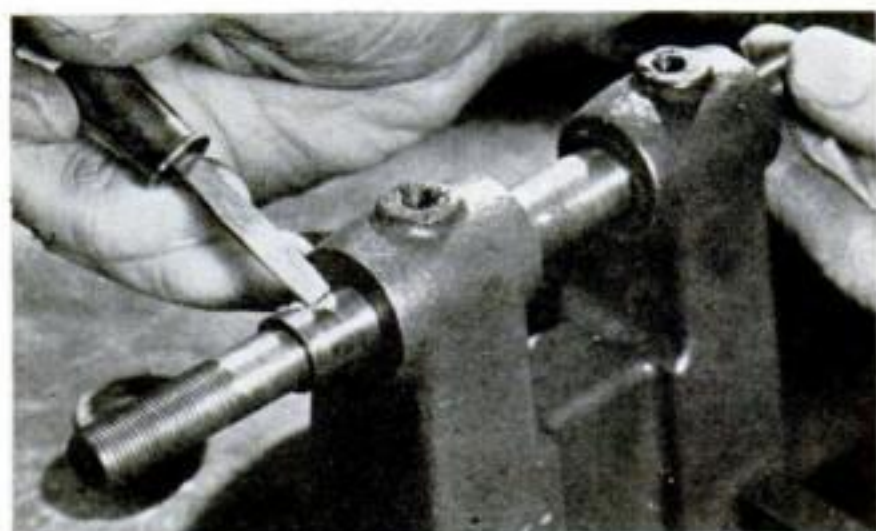
Self-capping oil cups like these are simply pressed into suitable holes. Grooves inside the bearing help distribute lubricant. For long wear, cut grooves where load is lightest.



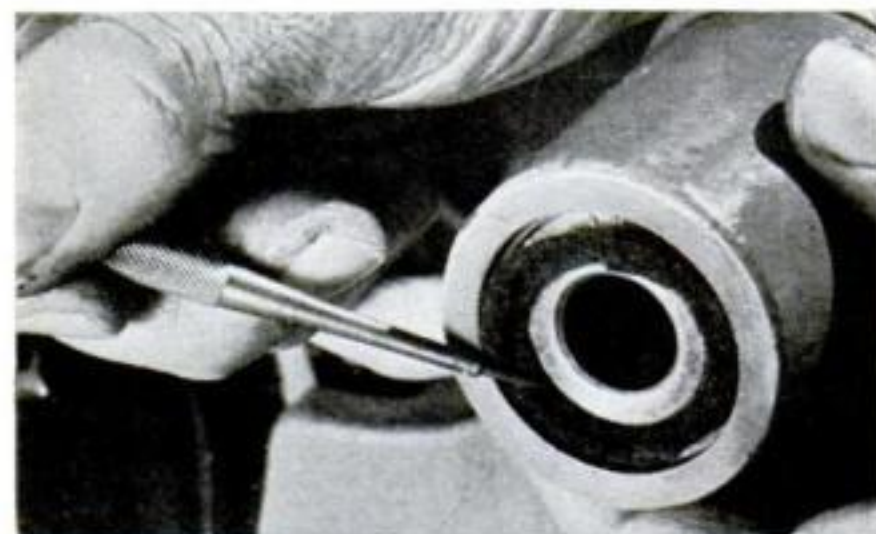


steel, cast iron, brass, and some alloys will make a serviceable bearing. Some excellent lathes have cast-iron spindle bearings. Properly lubricated, they stay accurate for years. The porous structure of cast iron holds oil and makes it a good bearing material.

To get a good fit for a shaft, drill the hole slightly undersize. Then bring it to size with a reamer, or with a second drill. To



Hand lapping frees a close bearing fit to running clearance. If the bearing isn't adjustable, use only fine compound. Clean both the shaft and the bearing of all traces of abrasive.



A felt ring seals the bronze bearing in this tool-post grinder against the grinding dust.

provide for adjustment, saw a slot through to the hole and provide a take-up (Fig. 5).

Substantial metal plates fastened to a wooden block by wood screws or by bolts will serve for light-duty bearings. The oversized shaft clearance hole through the block forms an oil reservoir. For a longer bearing, a bushing or a piece of tubing can be soldered, brazed, or welded inside a hole in a mounting plate. Such a bearing can project outside the mounting block, as in the drawing, or can extend partly or wholly inside.

Don't overlook the tapered bearing, long used in some lathes and milling machines. The bearing and that part of the shaft within it are both tapered, the slope being steep enough to have no wedging or binding effect. Play is taken up by tightening a thrust collar to move the shaft endwise, into the bearing. In making such a bearing, bore it and turn the corresponding shaft taper at the same setting of the compound rest.

Lapping. Plain bearings, tapered or straight, will fit better and wear longer if they're lapped to the shaft. Use a lapping compound to suit the metal—"soft" for bronze or babbitt bearings, "hard" for cast iron. Spread coarse abrasive sparingly on the shaft and inside the bearing, adding a little oil or kerosene. Turn the shaft by hand and move it endwise at the same time. Tighten an adjustable bearing a little as lapping continues. When the surfaces are lapped smooth, clean off the coarse compound and follow with fine one. Add more oil, but not compound, until you finish lapping with oil alone. Then clean all parts *thoroughly* and re-oil. If a bearing isn't adjustable, be careful not to lap it to a loose fit.

Antifriction bearings. The caveman who rolled a big log along across smaller ones invented the first antifriction bearing. Today's include ball, roller, and needle bearings, of which a few are shown in Figs. 7 to 13. You can't make your own, but with a little care you can select and install antifriction bearings in new gadgets, or replace worn ones in old.

What kind of bearing to use depends largely on the kind of load it must carry—whether radial (at right angles to the shaft), thrust (endwise or parallel to the shaft), or a combination of the two. Broadly speaking, radial ball bearings are for radial loads only, with little or no thrust load. Ball or roller thrust bearings are for end thrust only, while angular contact ball bearings, tapered roller bearings, and spherical-angular bearings will carry both radial and thrust loads.

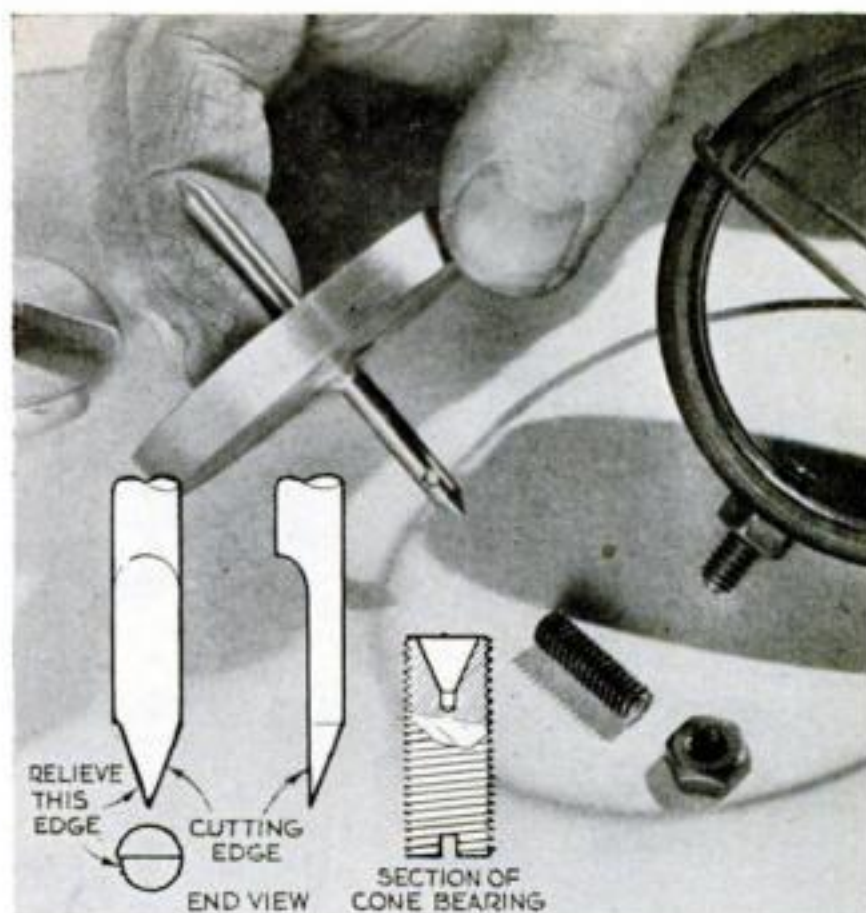
Self-aligning bearings have races that allow the shaft to run at a slight angle to the outer race. Shielded bearings are fitted with circular plates attached to one or both outer rings to keep out chips and dirt, but require lubrication, while sealed bearings have plates with gasketlike linings that retain lubricant for long periods.

It's common practice to make antifriction bearings a press fit on the shaft and a push fit in the housing bore, or to make the rotating race a press fit and the nonrotating race a push fit. If both were tight fits, thermal expansion might damage the bearing, while a light fit on a rotating shaft might let the inner ring turn and wear.

In machining bearing seats, a ground finish is preferable. When seats are merely turned or rough ground, the bearing rests on microscopic ridges, which in service are peened down, leaving the bearing loose. Enough of a shoulder should be left to align the bearing squarely on its seat. A low shoulder may let the bearing corner ride up. So may too large a fillet. It's good practice to turn a shallow, rounded undercut for clearance at the corner of the outer ring (Fig. 14).

Preloading, as the name implies, means that the bearing is installed under pressure in the same direction as the applied load, usually by a thrust washer and nut. This removes end play and keeps the bearing from shifting under load.

Installing antifriction bearings. Cleanliness is law in handling ball or roller bearings. Shaft seat and housing bore must be scrupulously clean; the least dirt



Pivot bearings in this gyroscope are adjustable in threaded holes and clamped with lock nuts. Sockets are first drilled, then reamed with home-made reamer not quite to the bottom.

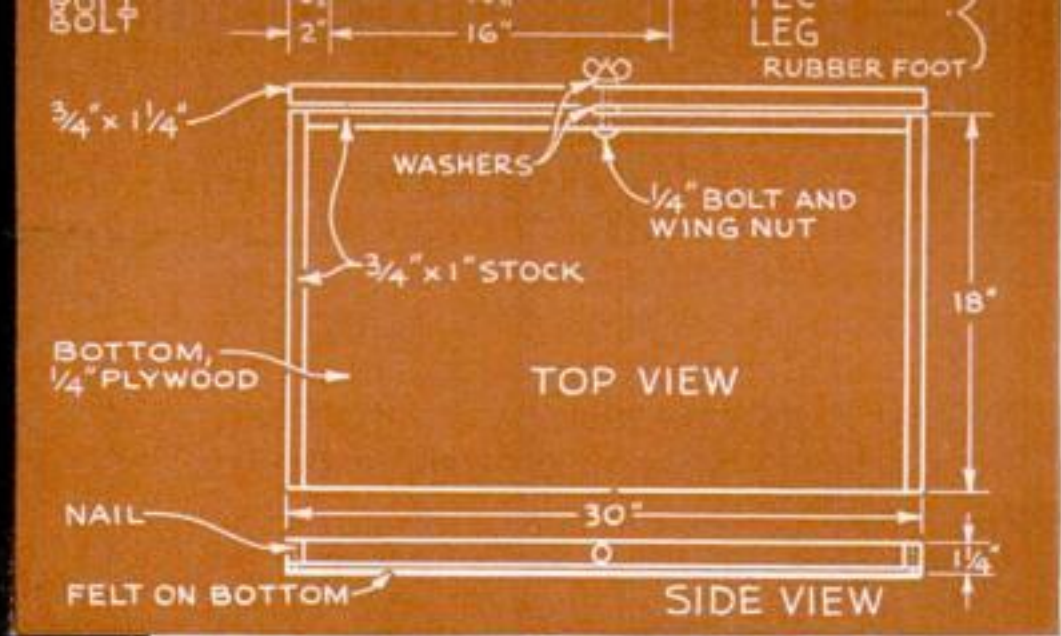
Oil won't readily coat solvent-moist metal, so clean, dry air is useful for blowing out solvent after cleaning. Here hose is rigged over a can. Bearing is held so it can't spin.



may throw the bearing out of alignment.

Bearings may be heated cautiously to about 250° , preferably over a lamp bulb, to make press fits easier. Be very careful to apply pressure evenly all around so as not to cock the bearing. If a hammer must be used, tap on a ring or a tube that fits the bearing race as shown in the drawing. Never hammer any part of the bearing directly. To press a bearing on a shaft, apply force to the inner ring; to press it into a bore, apply force to the outer ring—in both cases pressing the ring that is in direct contact with the seat, as in Fig. 15.

To clean antifriction bearings, soak them in kerosene or gasoline, brushing off external dirt. Never spin a dirty bearing in the fingers. Rinse washed bearings thoroughly in clean solvent. If you blow them dry with compressed air, be sure it's free from moisture and dirt, and don't let the airstream spin the bearings. Oil a cleaned bearing at once and wrap it in clean paper if it's not to be installed right away. END



Here's a Table for Your Chair

You can relax while you work at this desk. It can be built in an evening, used with a side chair or armchair, and folded flat when not needed. The layer of felt glued to one side makes it ideal for card games. Then, if you want to write, you can turn the top over. The 1" rails on three sides keep paper and pen from slipping off the top.

The adjustable support is a strip of hardwood that's slotted for 16" as shown. Attach the leg to the tray with a $\frac{1}{4}$ " stove or carriage bolt and wing nut. Run the bolt through the hole in the edge strip and the slot in the leg.—*Roland Cueva, Newport Beach, Calif.*

Chemical Removes Boat Paint

NO MORE chipping and scraping paint from hulls if you use this new chemical that dissolves the paint. It's a powder called Nelrem that's mixed with hot water (about 165° F.) and then sprayed on the boat under 6 lb. pressure. The Nelrem Corp., New York City, says it dissolves any oil-base paint at the rate of 150 to 350 sq. ft. per hour—depending on the type of coating and the number of coats. Nonacid, noninflammable, it can be used on autos, furniture, or buildings, but not on linoleum or leather.



Grille Cut in Drain Pipe

TO CARRY away rain water, this simple catch basin with strainer was made by cutting a series of slots in the top of the 8" pipe that's used as the drain.

The strips of metal left between the slots allow the lawn mower to roll over the drain. At the same time, the metal strips stop the entry of sticks and trash that might clog the drain and cause trouble. By cutting such slots, a buried pipe may be equipped with catch basins at each low point in the yard.—*Elton Sterrett, Houston, Tex.*





A small, outboard-powered skiff skims dry through white water when fitted with splash rails.

Aluminum Strips

Make Splash Rails

THE photo at the top of this page gives you an idea of the rough and tough water I can run in complete safety since I bolted aluminum splash rails to my 12' skiff. Before, it was impossible—I shipped too much water.

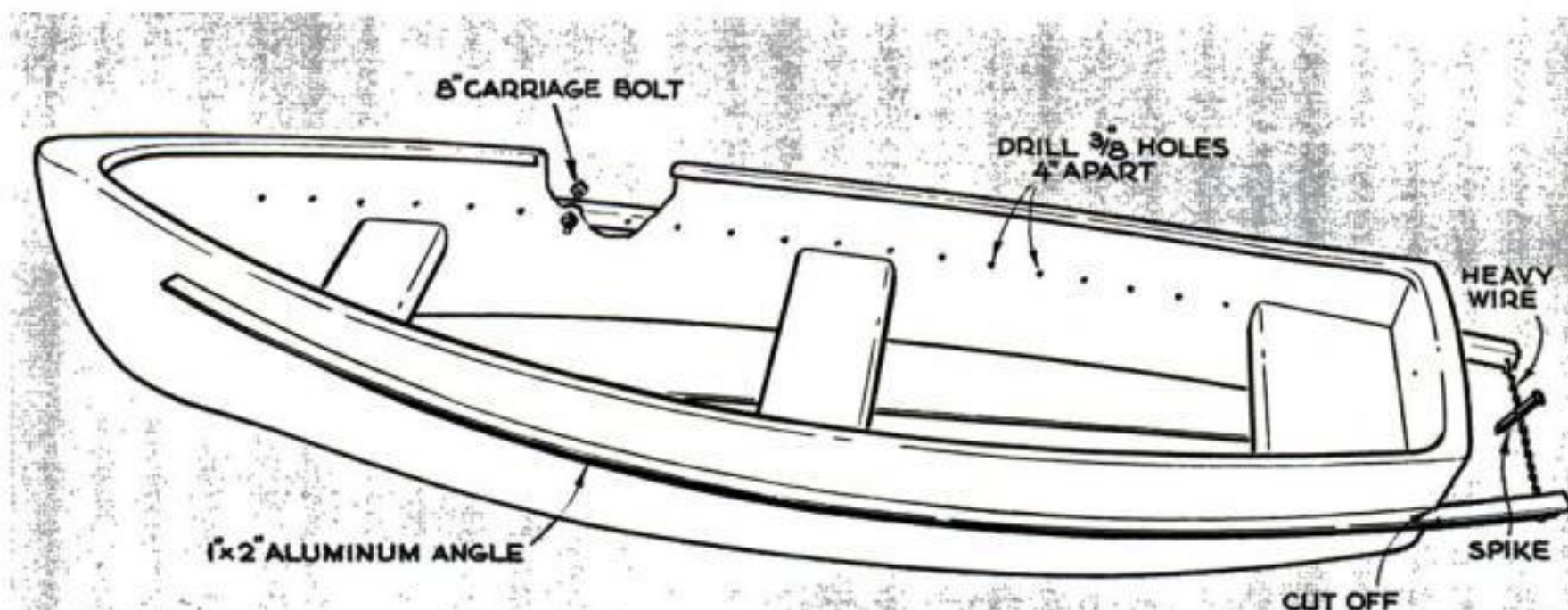
I used 1" aluminum bolts to tie the rails to my boat. If your boat is a wooden one, you may have to use longer fasteners. If you buy strips of aluminum angle that will project past the stern, you can use wire to pull them together at the stern. If you buy

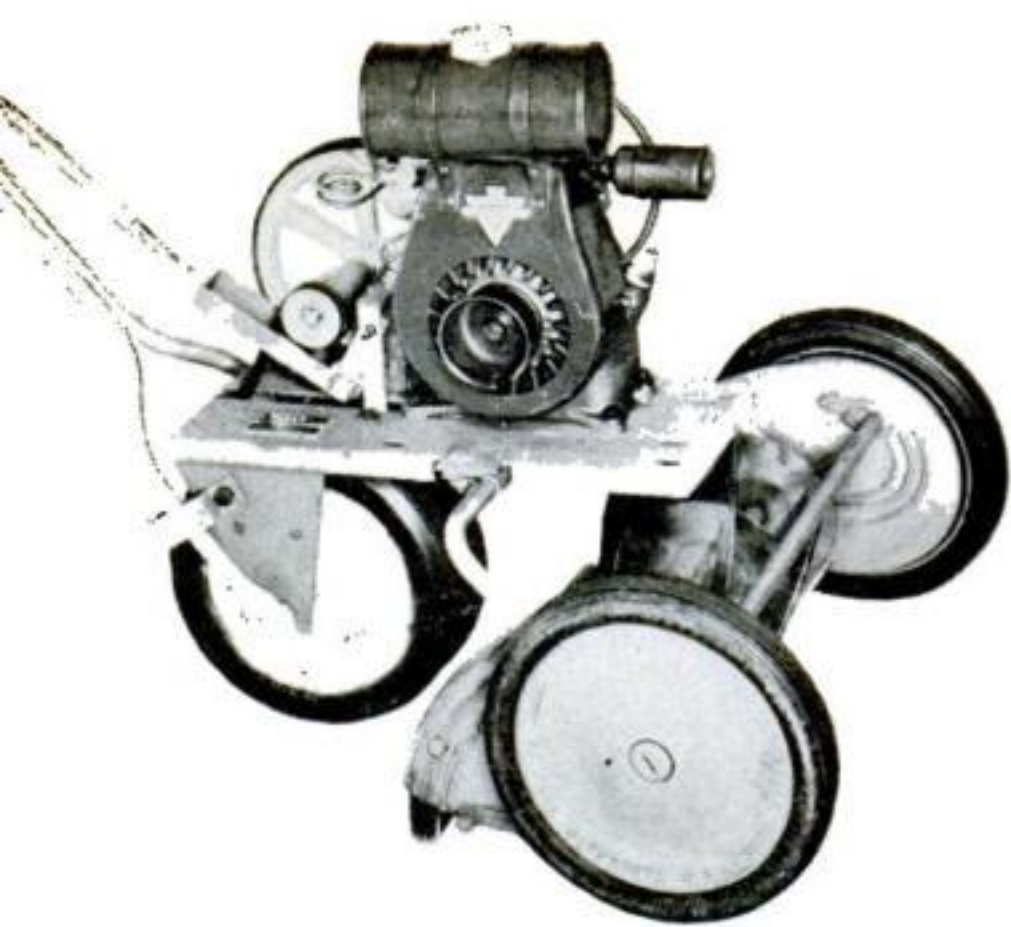
them just the right length, you can pull them in with a carriage bolt.

Here's how I located the rails. I measured the distance from gunwale to keel at several points. Then I drew a line on the hull a third of the way down from the gunwales.

Drill $\frac{3}{8}$ " matching holes at 4" intervals in the 1" side of the angles and in the hull. Start bolting at the widest part of the boat and work toward the bow. Use a $\frac{3}{8}$ " by 8" carriage bolt several holes ahead of where you're working. Tighten the carriage bolt inside the hull to draw the rail down and fasten it with the aluminum bolts. Then move the big bolt ahead.

At the stern, loop a heavy wire between holes in the very end of the rails. Twist the wire with a spike to pull the rails to the boat's side. Then bolt the rails in place and hacksaw off the projecting parts.—A. M. Chase, Wenatchee, Wash.





Gasoline Power Unit Clamps to Your Lawn Mower

You can add power to your old push-type lawn mower with this MidgeTractor. You remove the old handle, snap the unit in place, tighten a couple of bolts, and you're ready to chug over the lawn.

An air-cooled gas engine drives it. One V belt carries the drive from the engine to a countershaft, another from the countershaft to a pulley between the double wheels at

the rear. A clutch control runs up the handle. You turn the mower by lifting the rear wheels from the ground.

Complete with a 1½-hp. engine, the unit sells for about \$55. However, you can use your own gas engine or electric motor. In that case, the rest of the unit costs \$30. The maker is LeJay Manufacturing Co., Minneapolis, Minn.

Rear Axle Provides Gears for Posthole Digger

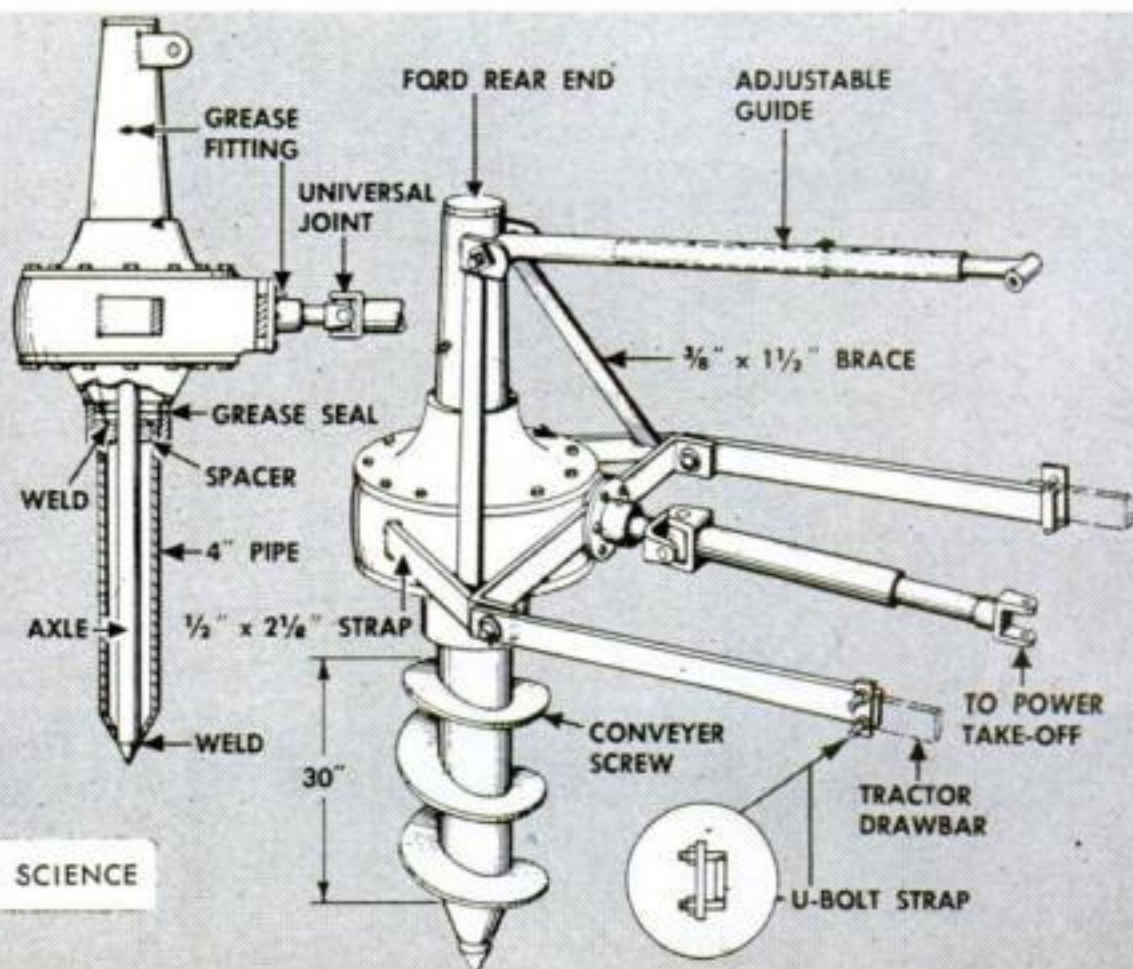
STARTING with an automobile rear axle, a farm welder can make a posthole digger like the one below. A tractor power take-off, fitted with a universal joint, drives the auger.

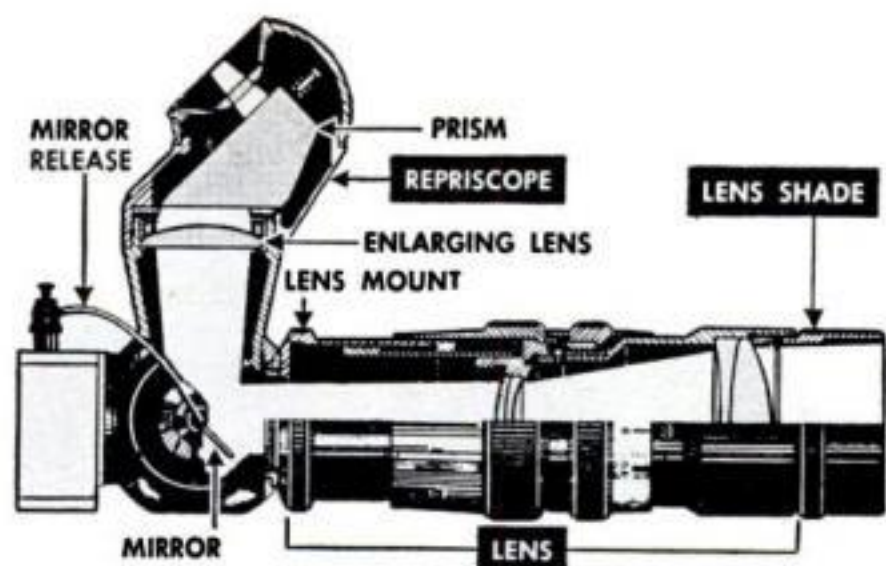
Cut away the axle housing on one side, letting the axle extend 30" or more. For the auger, weld a conveyor or stoker screw to some 4" pipe. Slot the end of the pipe, hammer it to conical shape, and weld to the pointed axle shaft. Use a spacer to support

the pipe on the axle, and a grease seal to keep the lubricant in. The differential gears must be locked or the upper shaft fixed from turning.

Cap the axle housing on the upper end. Fillet-weld the straps and braces in place. The adjustable upper arm consists of ¾" pipe telescoped in 1½" pipe.

Drawings for the project were prepared by the Lincoln Electric Co., Cleveland.





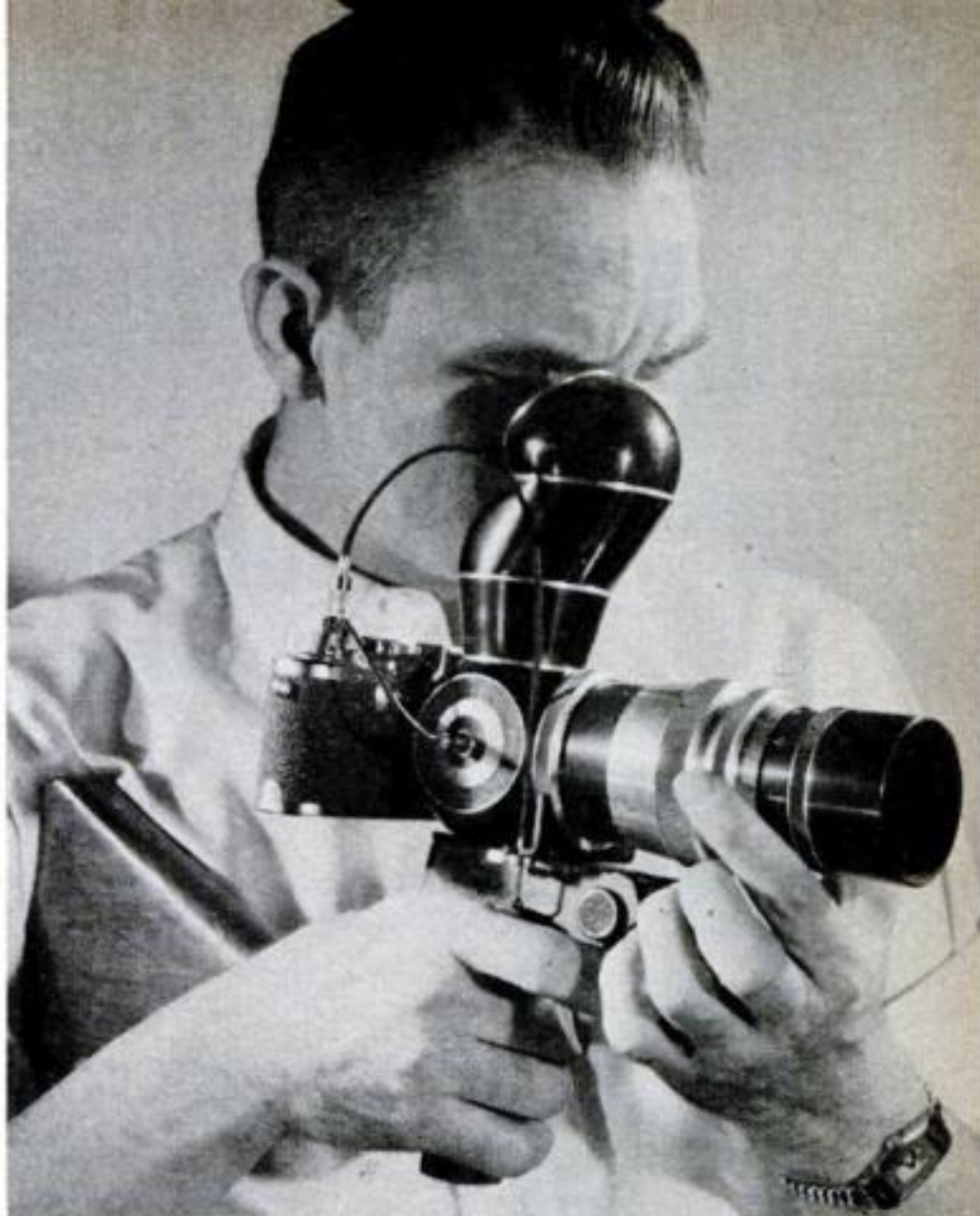
Gunstock Camera Shoots Closeup Photos Far Away

USING this outfit, you really "shoot" photos. A gunstock against your shoulder keeps the camera steady as you aim the telephoto lens at a distant subject. Pulling a trigger takes the shot.

You see the scene through a viewer called the Kilfitt Repriscopic. It's mounted between the telephoto lens and camera body. The optical system magnifies the scene and places the subject upright, with right and left sides in correct position.

As you pull the trigger, the cable release first operates a secondary cable, running into the side of the viewer. This swings a front-surface viewing mirror up out of the way. The cable then trips the shutter. To prepare for another shot, you return the mirror to viewing position by depressing an arrow-marked knob.

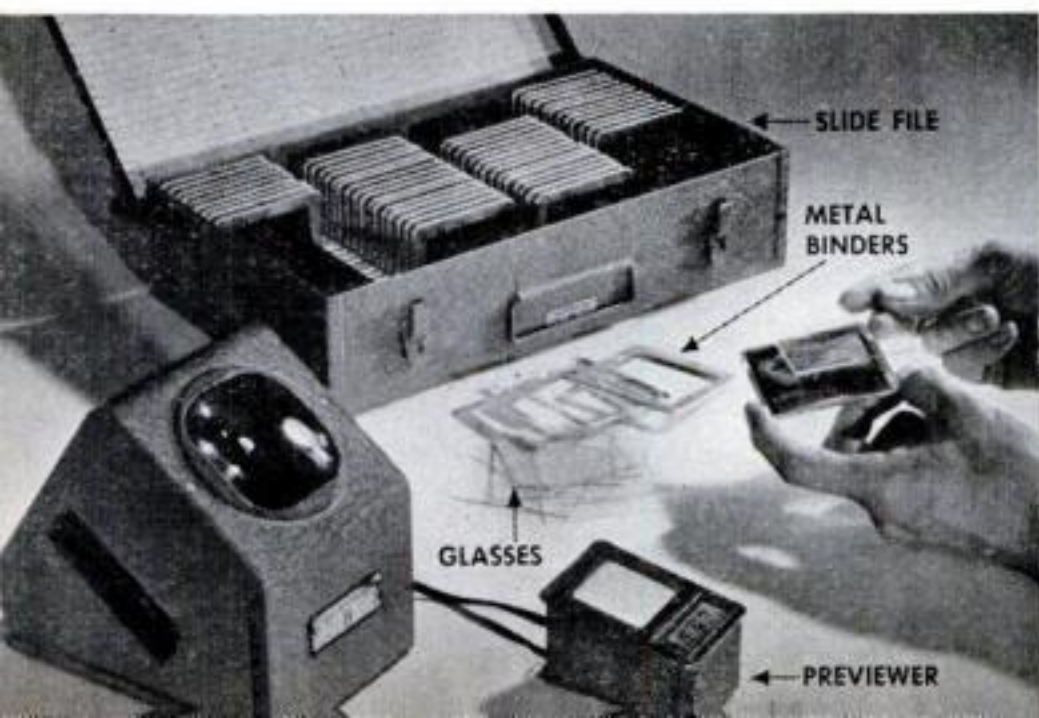
The Repriscopic can be used with four 35-mm. cameras—Leica, Contax, Foton, and Ektra. It's distributed by the Peerless Camera Stores, New York.



Viewer Shows Color Slides of Different Sizes

SHOWN at right below is a viewer that gives you an inexpensive way of looking at color transparencies taken by the popular 2¼" by 2¼" cameras. Flip a hinged adapter and you can also use it to view 35-mm. or Bantam-size slides (inset). An optically ground lens enlarges the image 1½ times and

gives a third-dimensional effect. Listed to sell at about \$6, the viewer is a product of Brumberger Co., Inc., of Brooklyn, N.Y. This company also makes the other slide accessories shown at left. The previewer gives a quick look at 35-mm. slides before you project them.



Here's How You Can

Build a Case for Your Camera

AN OLD brief case or handbag will often yield enough leather for a case tailored to fit your camera. Even parts of shoes and gloves may come in handy. Ordinary shoe dyes will even up color variations.

The case shown here is the popular ever-ready type. When the fasteners are un-snapped, the cover flap drops out of the way so you can take a picture without removing the camera from its case. An aluminum fitting under the case lets you detach the cover quickly whenever you want to. Snap fasteners could be used here if you don't have metal-working facilities.

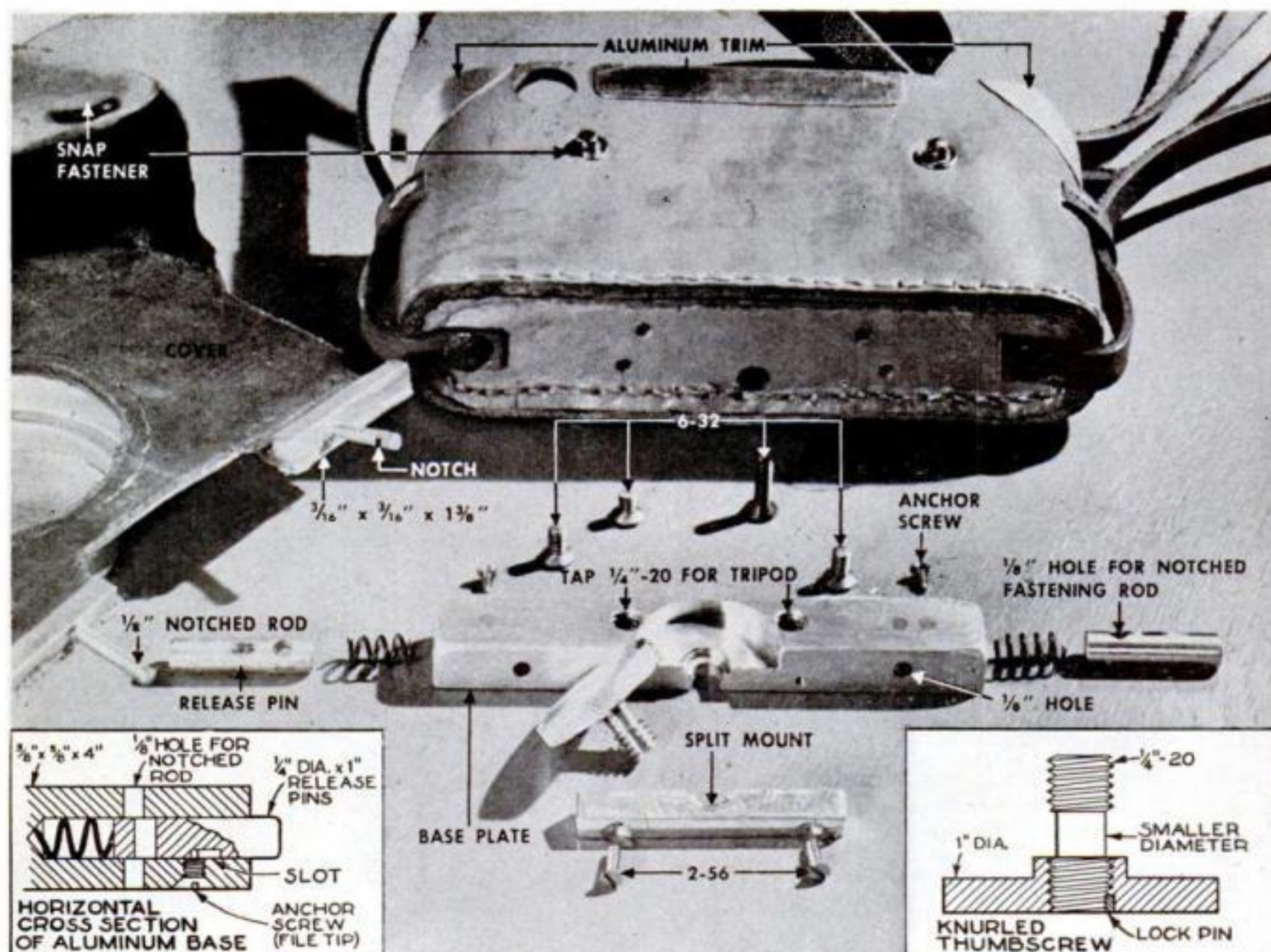
Cut and fit cardboard around the camera



Leather scraps bought at a leather-goods shop were used to make this case. A special lock permits quick removal of cover when desired.

in the shape of the various case elements. Four or five separate pieces are required. You will want a velvet or other soft lining inside, so allow for this in the cardboard patterns.

You can cement the lining to the leather pieces before assembly, but you'll probably



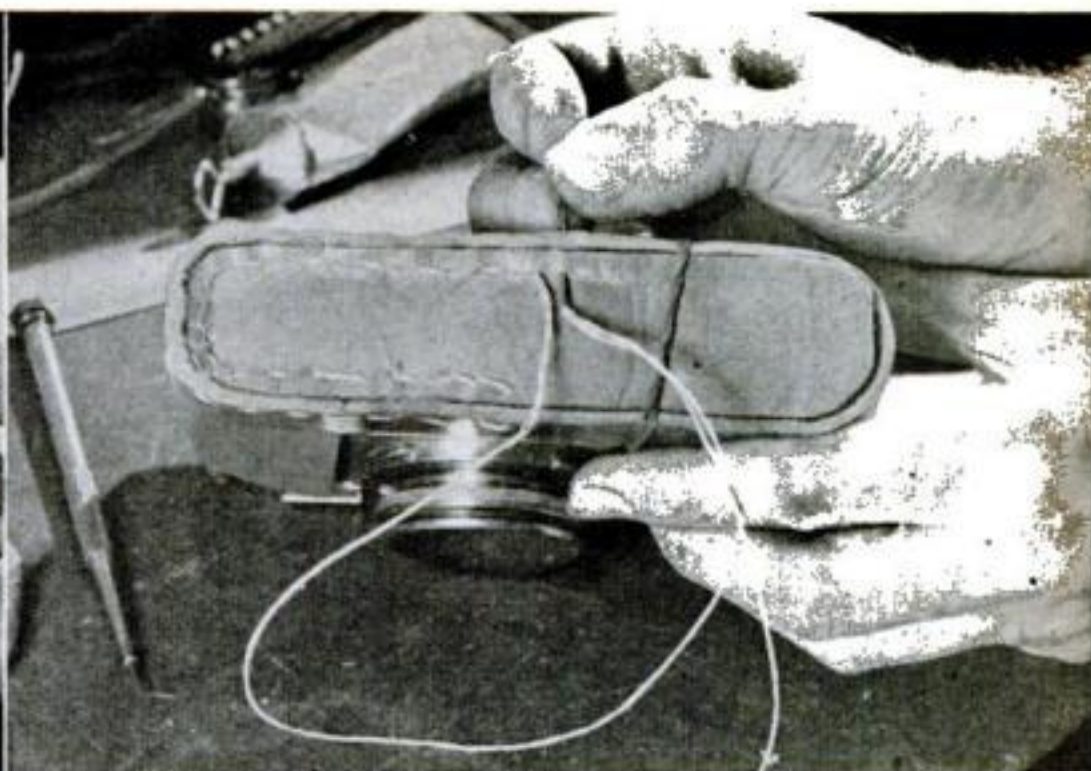
Spring tension against the $\frac{1}{4}$ "-diameter pins keeps the $\frac{1}{8}$ " notched cover rods locked in place.



Cardboard patterns fitted to the camera help cut leather. Cut the patterns big enough to allow for bending and the lining.

find it better to wait until all the seams are complete. The leather pieces can be joined by cementing, sewing, or both.

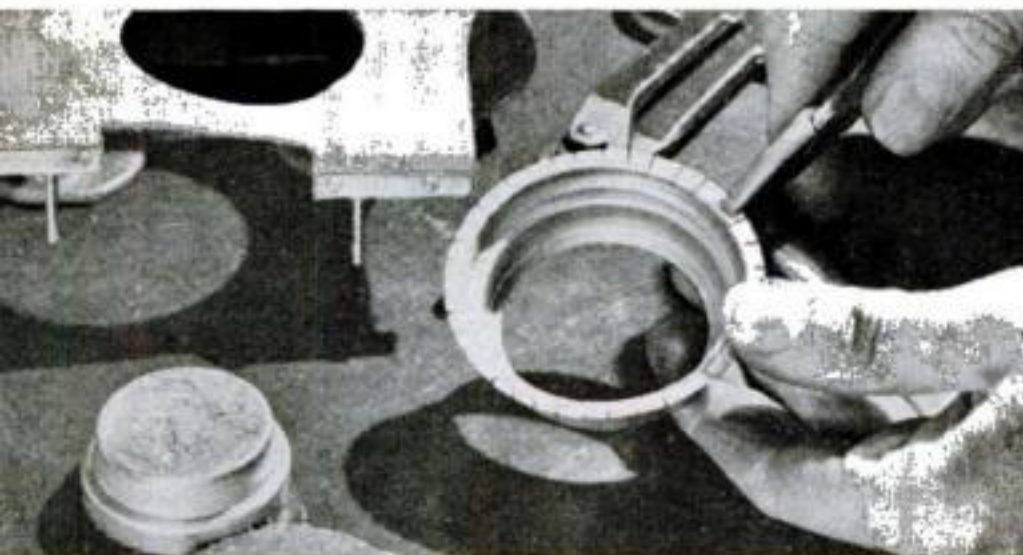
Sear the leather edges lightly with a soldering iron and then rub with a cloth. This produces a smooth finish and rounds off the edges. Some exposed edges in the



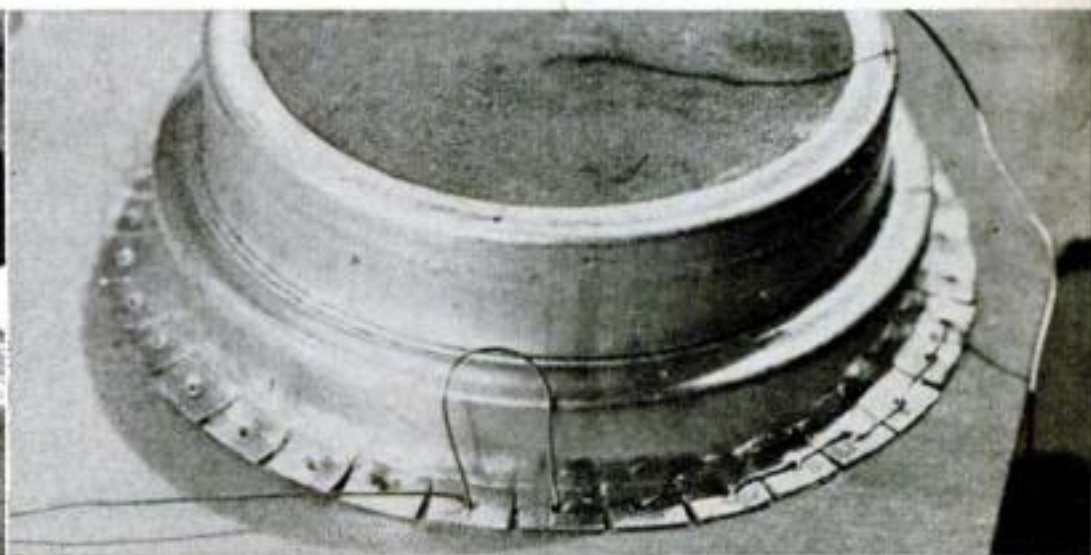
Sew on the bottom after fitting the main part around camera. Punch holes first with an awl. Use a strong thread—silk, nylon, or linen.

body of the case shown were protected with aluminum cemented with Pliobond. Install snap fasteners to keep the flap closed.

A front-flap recess to cover the lens can often be fashioned from a ready-formed cap or cup as suggested in the accompanying photos. Cement protective velvet over the



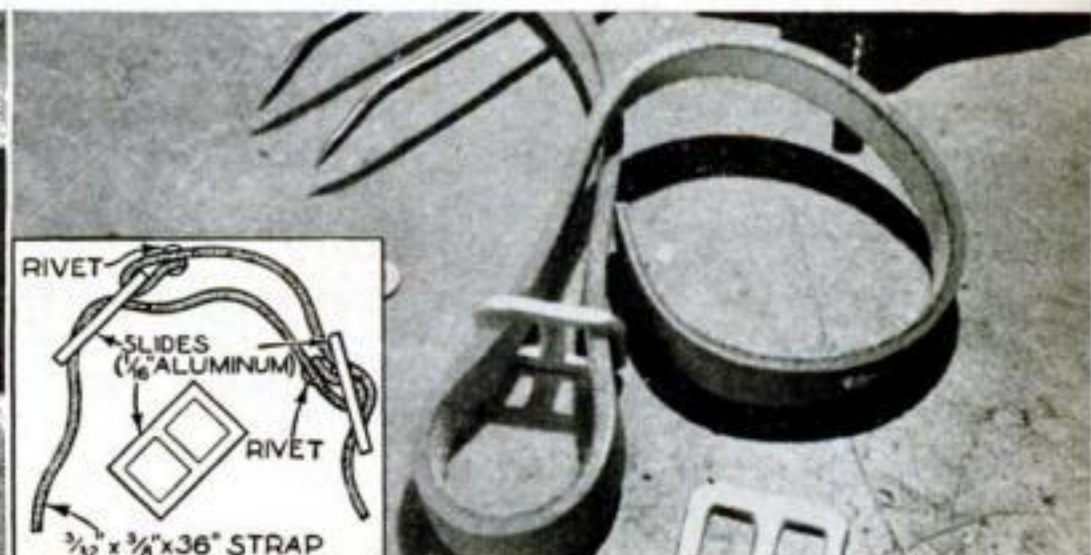
Lens recess was made from an aluminum gelatin mold. The bottom of stepped mold (lower left above) was cut off. Edge of other piece



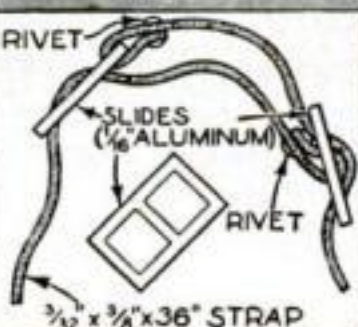
was then snipped, and tabs bent out as above. Fine wire was run through drilled holes to keep it in place. Cemented leather disk closes the end.

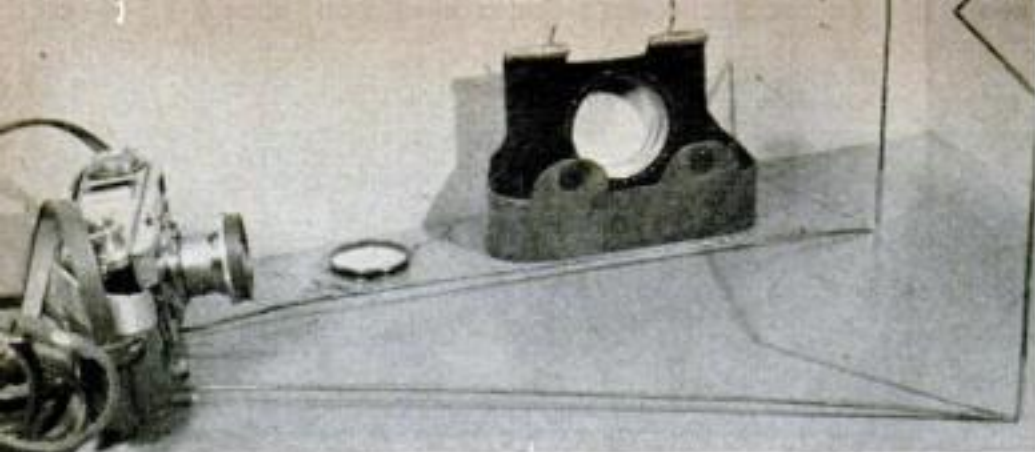


Cover is removed or attached by pressing in the push-button plugs and pulling out or inserting notched rods. Base has two tripod sockets.



Metal slides fitted as shown make strap adjustable. Strap ends are riveted to bottom of case and pass under loops sewed to the sides.





A wire frame for close-up photos attaches to metal base after cover is removed. Used with supplementary lens, frame outlines picture area and marks the point of sharpest focus.

wire stitches on the inside surface, and check to be sure nothing can scratch the camera.

The aluminum fitting on the base of the case holds the camera in, provides quick release of the cover, and also holds a wire focusing frame. An "exploded" photo on a

previous page shows its parts. Note that the cover is held to the aluminum base by two notched rods that fit into holes in the side of the block. With the cover attached, the notches are engaged by two release pins held out by spring pressure; when you want to take the cover off, light pressure on the two release pins frees the rods. Tiny, filed-down screws engage grooves in the release pins, keeping them from falling out and preventing them from turning.

The advantage of the split mounting for the knurled thumbscrew is, of course, that it enables the thread to be larger than the hole around the neck of the screw. This keeps the screw from dropping out when you loosen it to remove the camera.—Walter E. Burton, Akron, Ohio.

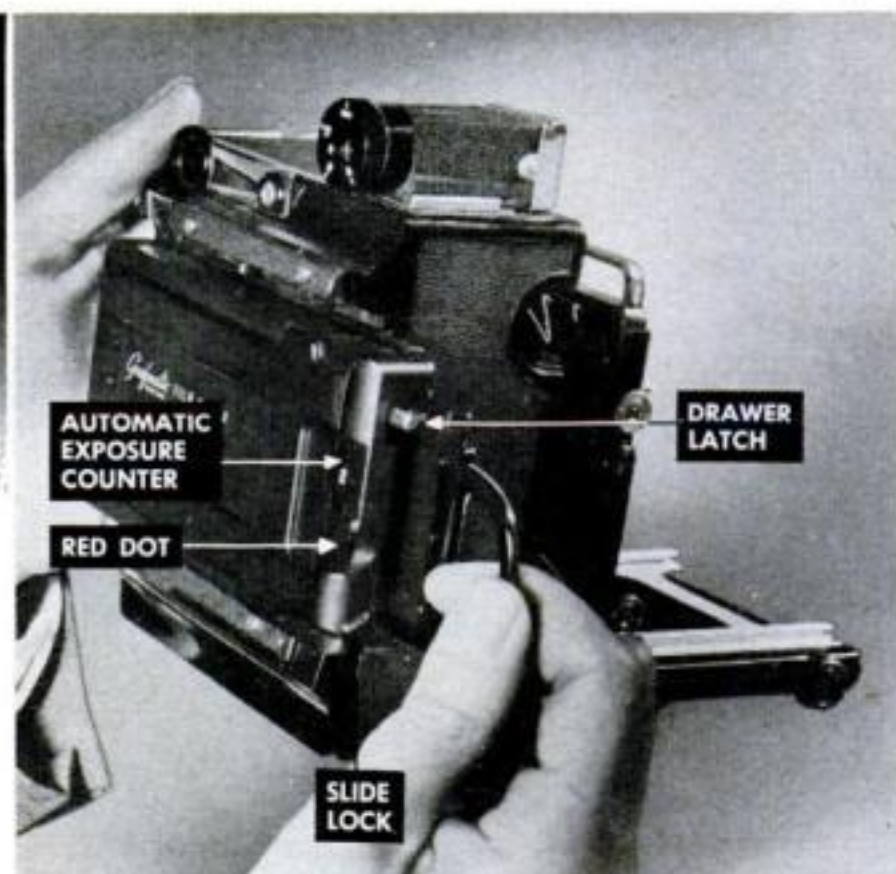
Cut-Film Holder Takes Six Shots at One Loading



A NEW cut-film magazine announced by Graflex, Inc., enables you to take six shots in quick succession. At present it's available only for 2¼" by 3¼" cameras.

No larger than a film-pack adapter, the Grafmatic Film Holder fits on the camera back like a conventional holder. To prepare for an exposure, you turn the slide lock, pull out the slide, and immediately reinsert it. While the slide is out, a spring pushes a sheet of film ahead of it—ready for exposure. A red dot appears on the magazine back, showing the film is ready.

After making the exposure, you hold down the drawer latch and pull out the handle. This pulls out the entire drawer, containing the unexposed films, and allows a spring to force the exposed sheet into the back of



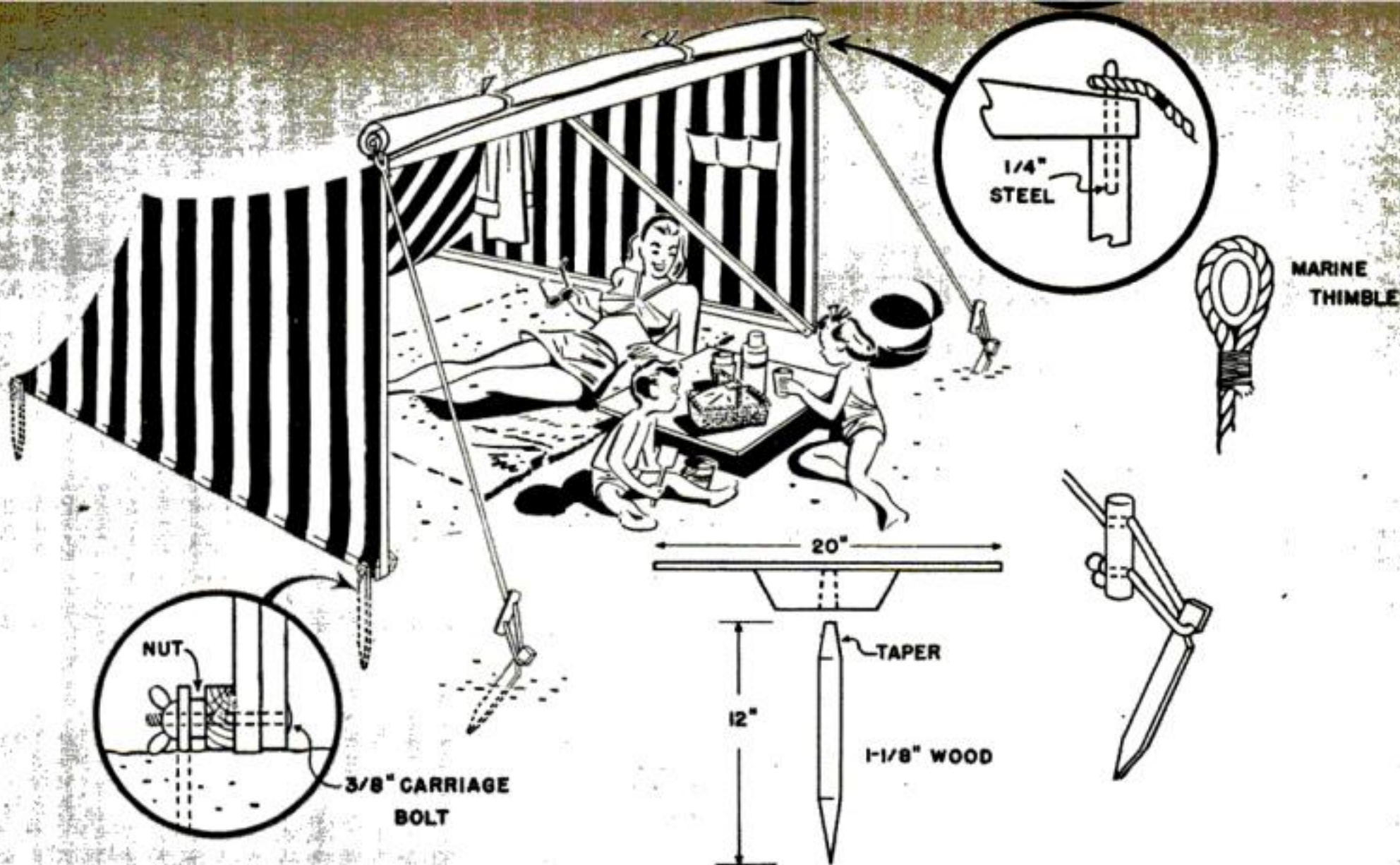
the case. For another exposure, pull out and insert the dark slide as before.

The film holder sells for about \$16.

Gooseneck Positions Reflector

WITH this gooseneck attachment, I can swing my flash reflector to any desired position. A hole was drilled in the camera box and the gooseneck attached with a bolt and wing nut. The reflector clamps on the lamp socket.—W. C. Vestal, Redlands, Calif.





You Can Take Shade with You

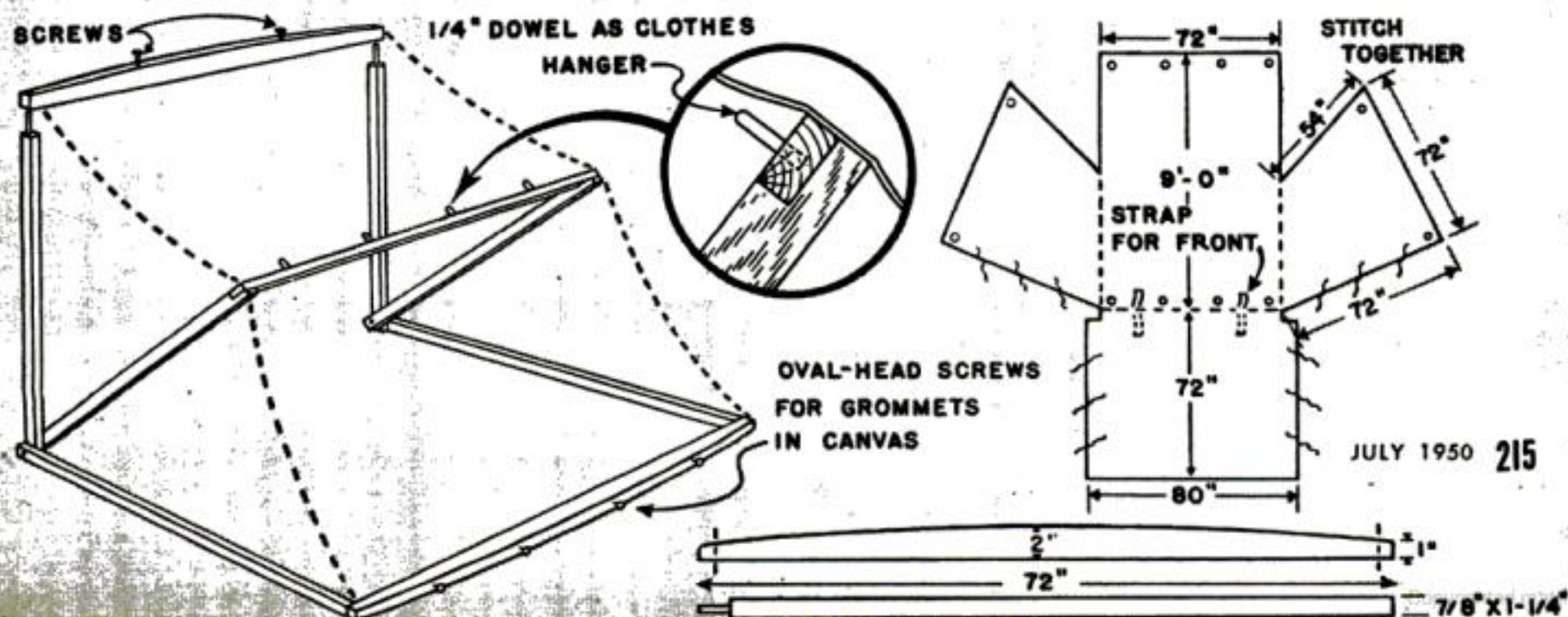
HERE'S an inexpensive, easily built shelter for beach or camping. It protects you from sun and wind, does duty as a dressing room, and folds up neatly for carrying. No special racks are necessary to haul it in your car.

Pegs for hanging up clothing and pockets for small articles are provided. A one-legged table with a top of $\frac{1}{2}$ " waterproof plywood keeps food and bev-

erages up out of the sand. The leg of the table is pointed so it can be shoved down in the sand to hold the table steady. Each corner and the two guy ropes are firmly anchored with steel stakes. Assembly of the frame is shown. The three struts on each side are bolted at the lower front corner. Crown beams fit over steel pins.

Striped awning cloth makes an attractive covering. One of the drawings shows how to cut it. Grommets are put in where indicated and cloth straps provided for holding up the rolled front wall.

When you're ready to start for home, tie the struts and beams to the bumper of your car. Stow canvas, stakes, and table in the trunk compartment.—Hi Sibley, Nuevo, Calif.



Make That Toy Really Sail

LOW-COST toy sailboats look seaworthy enough when you see them on a store counter. But it's another story when they're sailed in a lake. To their small owners' dismay, they usually are tipped over by the wind, or else they sail aimlessly in circles.

But with a few changes to compensate for bad design, the toy boats can be made to skim smoothly across the water. You need an 8-oz. fishing sinker, a short length of brass tubing, and a piece of cord.

Pull the rudderpost out of the rudder and reverse it so the tiller points astern. Ream the rudderpost hole in the deck so the brass tubing will fit it. The rudderpost should be able to turn freely inside the tube.

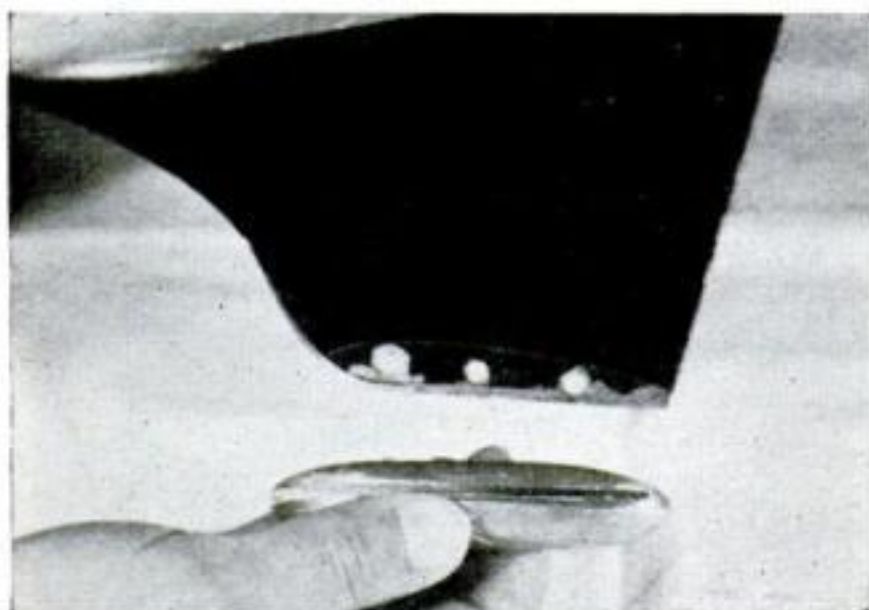
Tie the mainsail to the mast and boom at 2" intervals. This keeps the wind from spilling out of the sail. Fasten the sinker to the keel as shown. Then place a block of



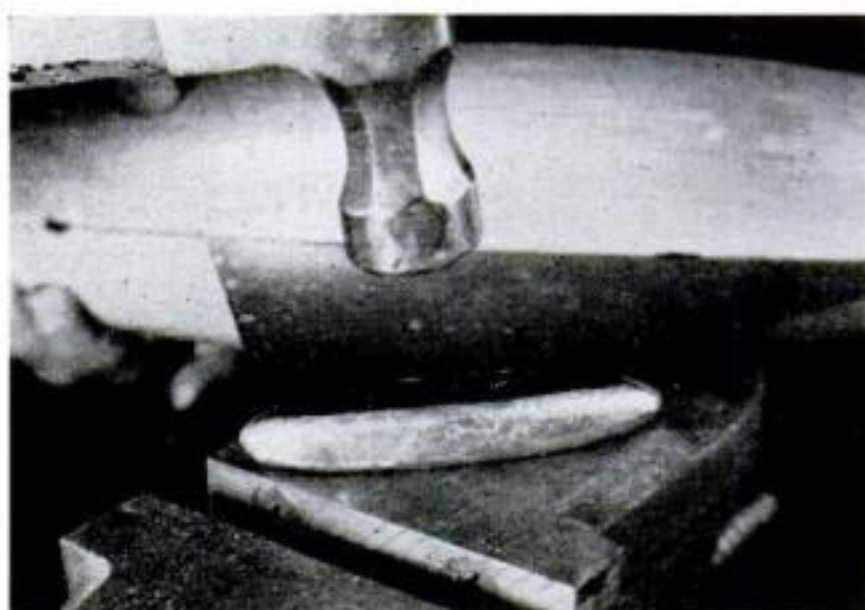
Seaworthy sailboat is launched. With new rudder and tiller arrangement, toy ship will sail a straight course and is hard to capsize.

wood against the front of the keel and drive it back to within $\frac{1}{4}$ " of the rudder. Now the boat rides with bow slightly raised.

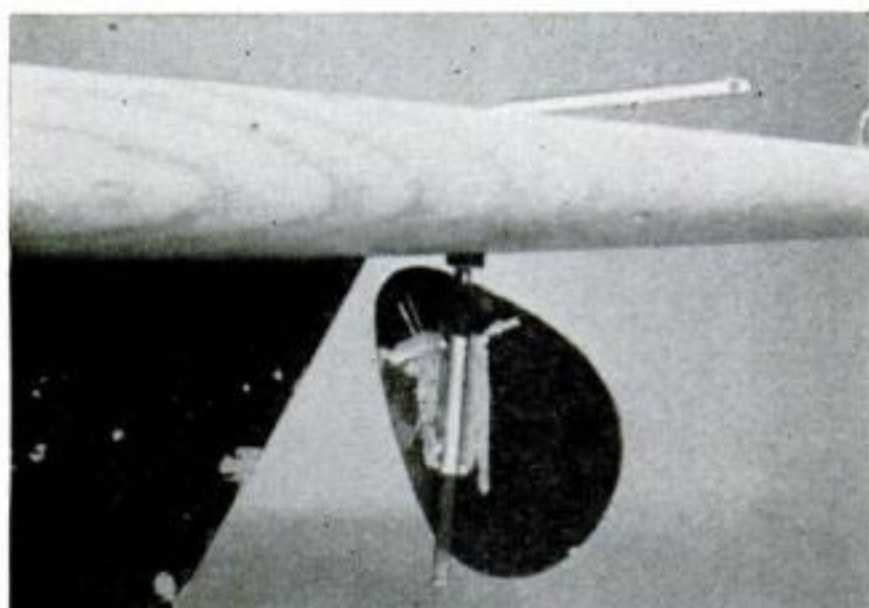
With this rudder arrangement, the boat sails a straight course. Wind fills the mainsail, causing the boat to head up into the wind. But the boom pulls the tiller over and the boat falls off again and keeps on course. —A. C. Kubitz, Millbrae, Calif.



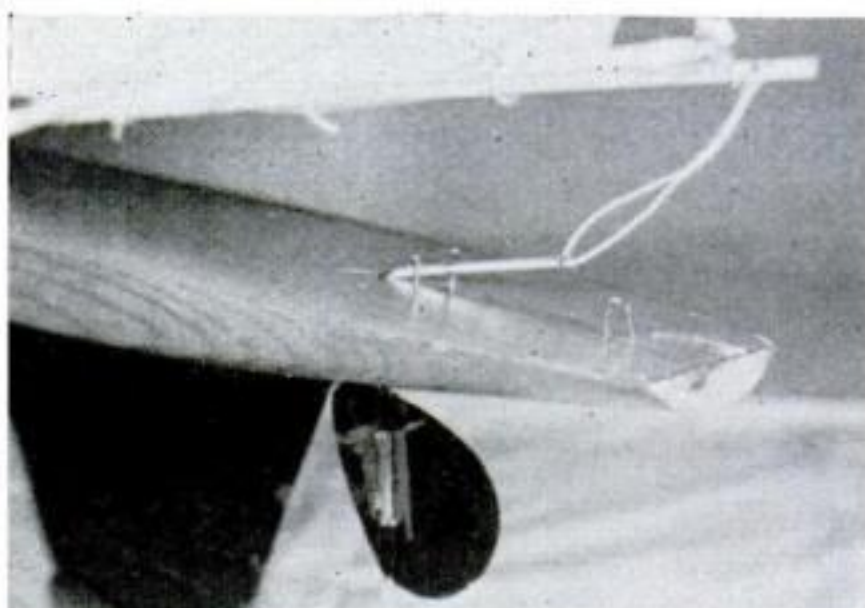
Sinker is slotted three-quarters of its thickness. Three $\frac{5}{32}$ " holes are drilled in keel as shown, and sinker then is slipped over keel.



Sinker is tapped lightly and evenly on both sides of keel. This forces lead of sinker into $\frac{5}{32}$ " holes, and secures sinker to keel.



Tiller is reversed and rudder soldered to rudderpost in new position. Brass tubing through deck lets rudderpost turn freely.



Swing of tiller is stopped by two brads $\frac{3}{16}$ " on each side of tiller and $\frac{3}{8}$ " back of rudderpost. Cord is tied between tiller and boom.

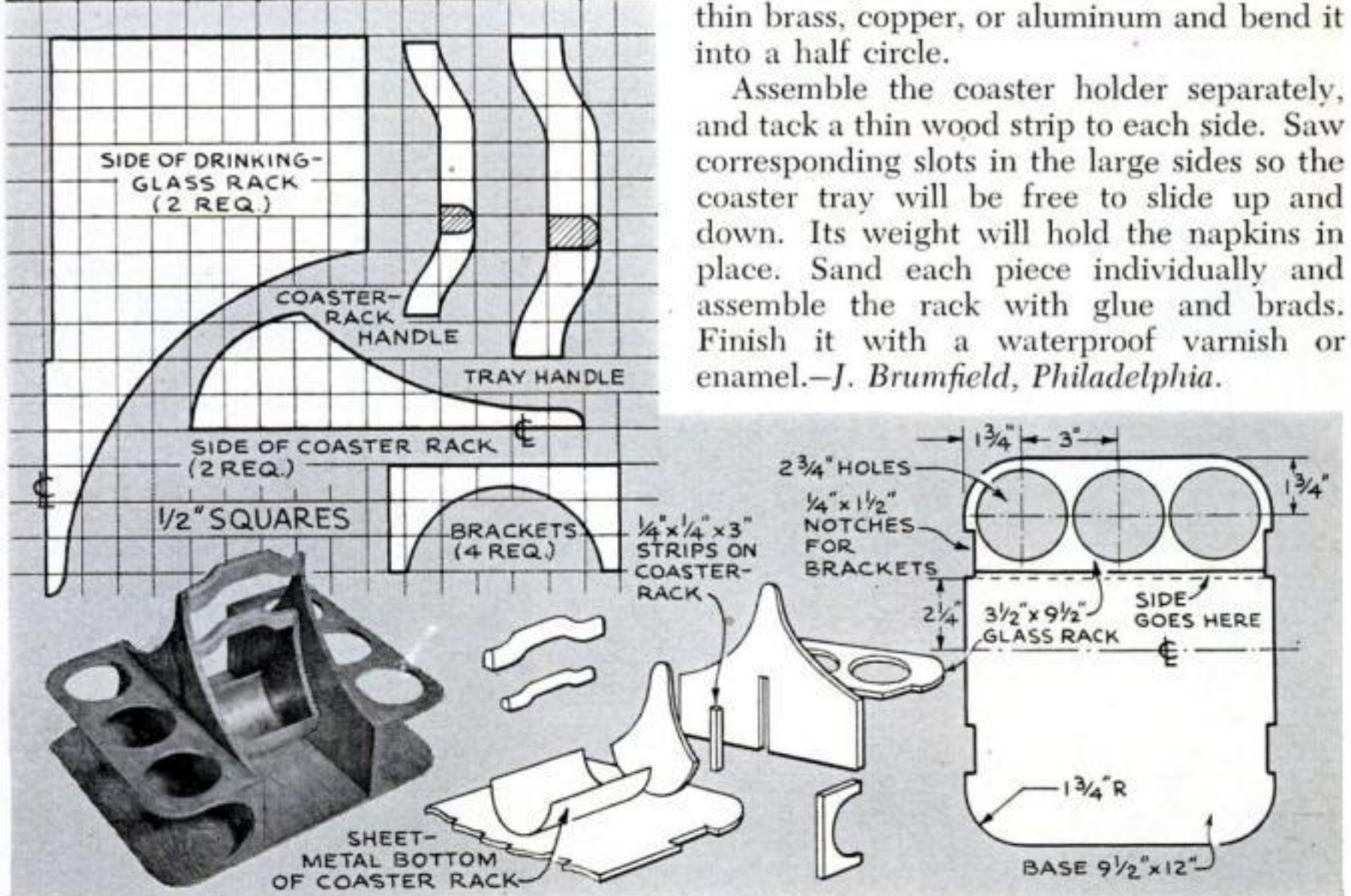


Rack Carries Glasses, Coasters, and Napkins

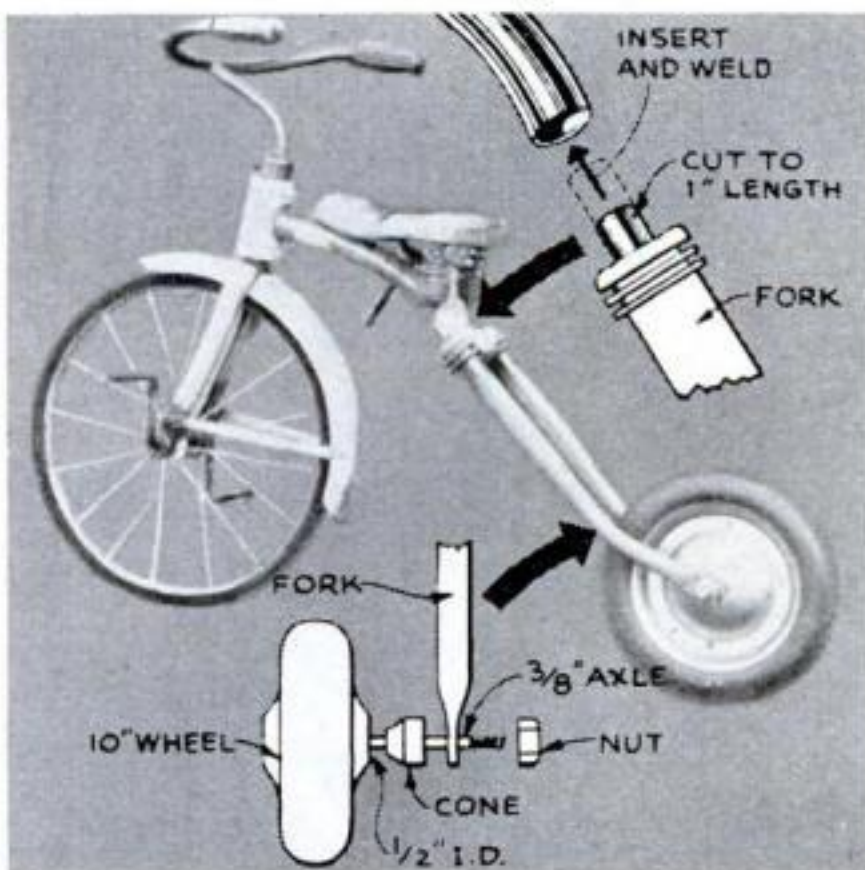
THIS combination drink server is a boon to any informal party. Holding half a dozen tall glasses, the tray also has a handy center compartment for coasters and napkins. Making it is only an evening's work.

Use $\frac{1}{4}$ " plywood to make the bottom, sides, and glass retainers, and $\frac{1}{2}$ " hardwood for the handles. For the bottom of the coaster tray cut a $5\frac{1}{4}$ " by $3\frac{15}{16}$ " sheet of thin brass, copper, or aluminum and bend it into a half circle.

Assemble the coaster holder separately, and tack a thin wood strip to each side. Saw corresponding slots in the large sides so the coaster tray will be free to slide up and down. Its weight will hold the napkins in place. Sand each piece individually and assemble the rack with glue and brads. Finish it with a waterproof varnish or enamel.—*J. Brumfield, Philadelphia.*



Cut-Down Tricycle Becomes a Two-Wheeler



MY YOUNGSTER had reached that in-between stage where he'd outgrown his old tricycle but wasn't quite ready for a bike. I put him back on wheels with the low-slung, easy-to-ride bicycle shown at the left. It is made from the old tricycle, the front fork and axle of a standard bike, a 10" rubber-tired ball-bearing wheel, and a couple of cones, washers, and nuts.

The sketch shows how I mounted the wheel in the fork, using the cones to center the standard $\frac{3}{8}$ " bicycle axle within the $\frac{1}{2}$ " inside sleeve of the new wheel. I left about 1" of tube at the end of the fork, sawed off the tricycle frame, and inserted the tube into the frame. After lining up the wheels, I welded the frame and fork together.—*Edward H. Roberts, Moline, Ill.*

Now You Can Patch Metal With a Brush or Knife

COLD metals that are applied with a brush or knife can be used for almost any metal-mending work around the house. You also can use them on wood, plastic, or other surfaces without heat or special tools. You can build them up in layers to make patches of any thickness. While soft they can be molded; after they are hard, they can be machined, ground, or drilled.

These plastic metals—aluminum powder mixed in vinyl-resin binders—will withstand extreme cold and above-boiling heat; they're

waterproof, rustproof, and can resist pressures of 150 pounds a square inch.

Modern plastic metals have been used for several years by industry. They are now coming out in kits designed for the home handyman. One such kit, called Met-L-it, made by the R. M. Hollingshead Corp., Camden, N. J., is pictured in photo 1. Steps in a typical repair job are shown in the photo-sequence below. Some of the other applications that are possible are illustrated on the opposite page.

Here's How to Do It



1. The household kit, left, contains a roll of fiber used for bridging large holes, cans of metal paste and solvent, a brush for applying paste, and sandpaper.



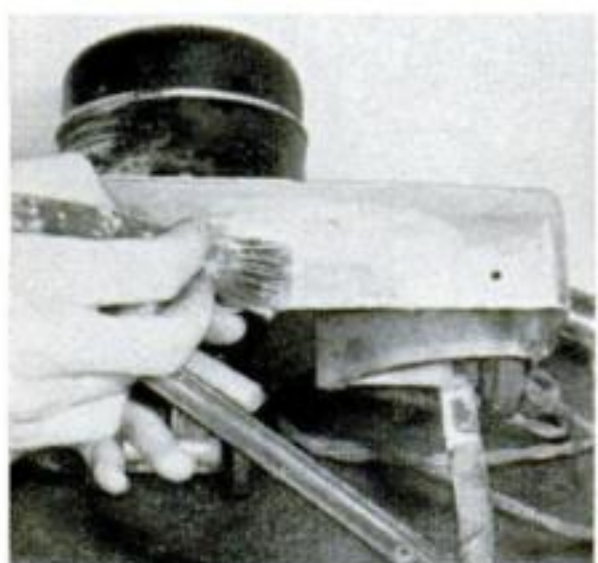
2. Repairing a broken vacuum-cleaner housing is now a simple job. First file the area around the break to clean and roughen the metal. This improves adhesion.



3. Cut a fiber patch, dip it in solvent to soften it, and press it over the hole. Shape the patch with your fingers. It dries fast, sticks firmly to metal.



4. When fiber is dry, feather the edges with coarse sandpaper to make the patch blend into the surrounding metal. Don't smooth the surface.



5. Apply several layers of the metal paste with a brush or knife till the patch has desired thickness. If paste is too heavy to use, thin it with solvent.



6. File and sand the new metal to a smooth finish. The patch will be practically invisible and should last as long as the cleaner itself in normal use.

Here's What You Can Do



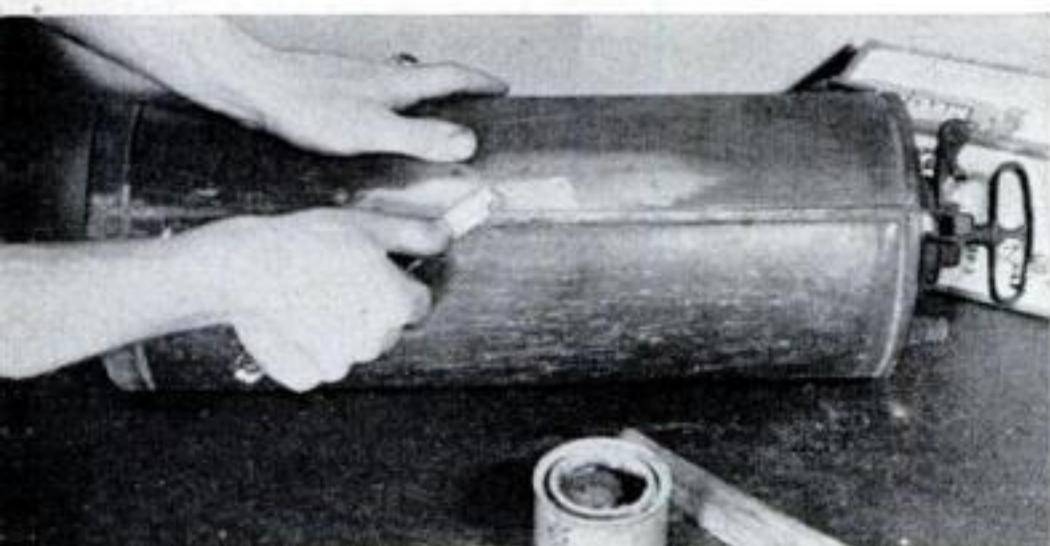
Boiling water won't affect this plastic-metal leak stopper.



Fan blades out of balance? Dabs of cold metal stick to aluminum.



Durable, waterproof repairs take only a few minutes. Cold metal can be primed and painted like any other.

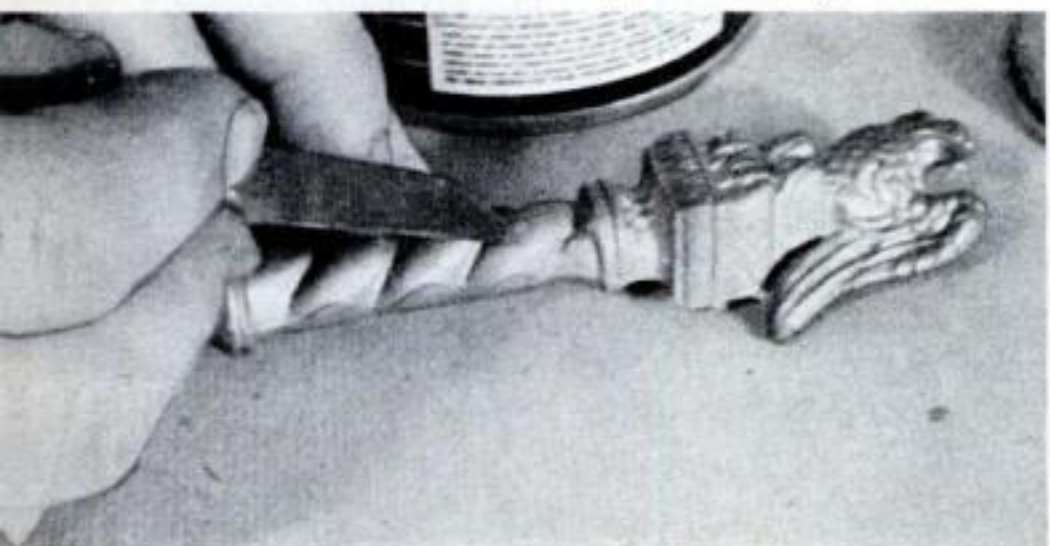


Pressure-resistant patch repairs plant sprayer.



Drippy watering-can spouts are quickly fixed.

Small defects in castings are easily mended.

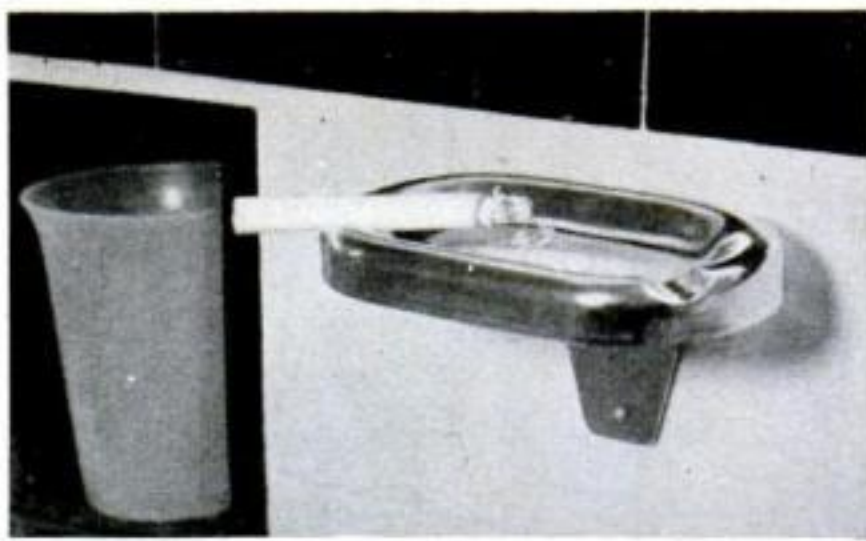


Farms have plenty of jobs for plastic metals.



Sandpaper in Liquid Form

NOR a paint remover, Liquid Sandpaper acts like a very fine abrasive paper. It cleans and prepares painted wood, metal, and plaster surfaces for refinishing. Applied with a cloth, a light wiping does the job instead of the hard rubbing you would need if you used sandpaper. On natural wood-grain finishes, the maker—General Liquids Corp., Baltimore—recommends that you use steel wool saturated with the product.

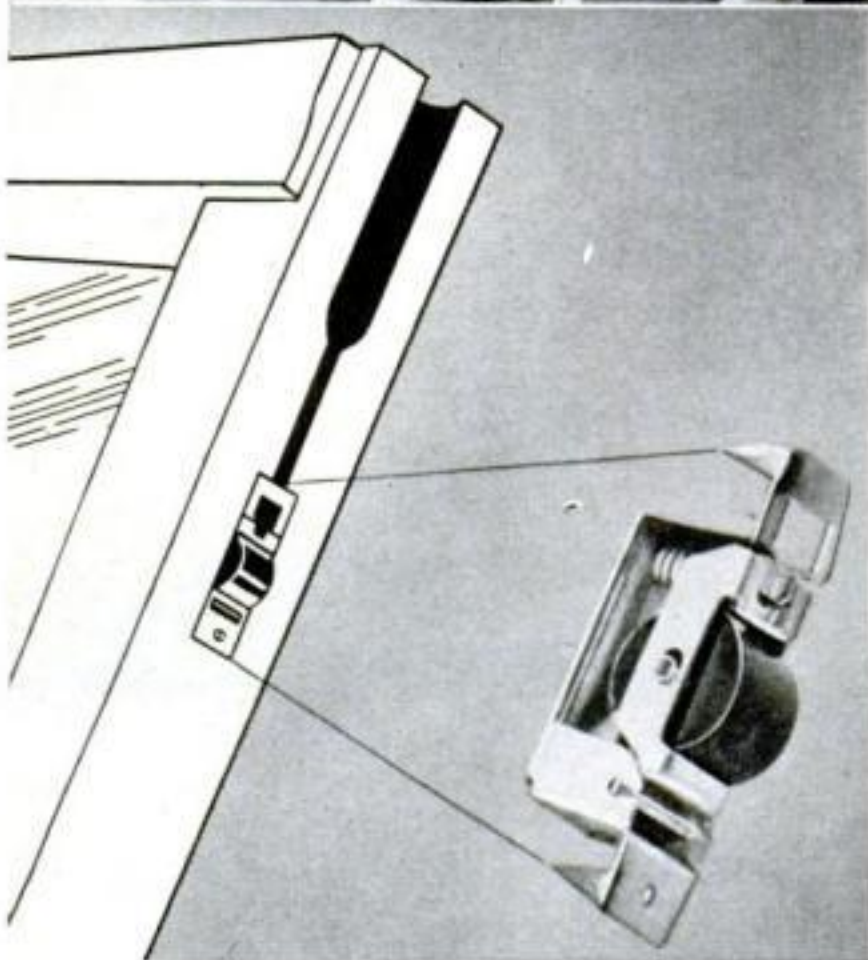
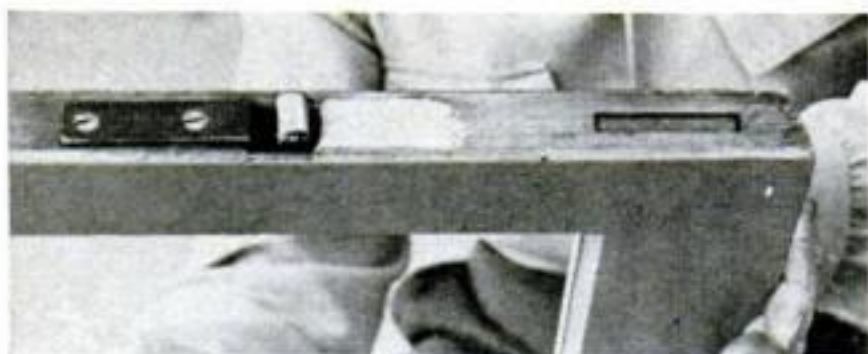


Ash Tray for Tile Walls

NO SCREWS, bolts, nails, or other fasteners are needed to attach this ash tray to any wall—tile, glass, wood, or metal. A plastic adhesive binds a clip to the wall. The removable ash tray fits on the clip. This method of attaching the tray is especially handy in tile-walled rooms—such as the bathroom. It eliminates drilling the tile. The chrome tray is priced at about \$2 by Household Aids, Inc., of Rochelle Park, N. J.

Rollers Substitute for Sash Weights

BORN of the easy-to-install gadgets pictured below take the place of sash cords and weights by pushing the window against the frame.



Top picture shows the Window Check, made by Paul C. Wells, San Diego, Calif. It's a roller on flat spring steel. Two screws hold it to the sash.

The Sash Snubr, made by Verb Manufacturing Co., Coffeerville, Kan., is shown in the drawing. It's a stainless-steel holder and spring that exerts pressure on a synthetic-rubber roller. It may be installed in the sash or in the window frame.

Both devices hold a window in any position, and both stop window rattles.

Double-Duty Hose Nozzle

SCREWED to the end of your garden hose, this nozzle serves as a lawn sprinkler or—with the sponge-rubber pad—as a car washer. Both are manufactured by Molded Specialties, Inc., of Cleveland, Ohio. As a car washer, it's a water saver. The instant you release pressure on the trigger, the water is shut off. If you want a constant stream—for lawn spray or other purposes—you just snap a lock ring over the trigger.



Clothes Washer for Camp Use Built Like Churn



THIS hand-powered washer is a natural for camps and other places that lack electricity and plumbing. You can make it in half an hour from scrap materials.

Cut a wood disk to fit loosely in the bottom of your biggest pail. Bore a dozen $\frac{3}{4}$ " holes in it and nail on a pair of $\frac{3}{4}$ " cleats to space it up from the pail bottom. Round off the corners of a square piece of wood, bore about four $1\frac{1}{2}$ " holes in it, and screw it securely to a short cedar pole.

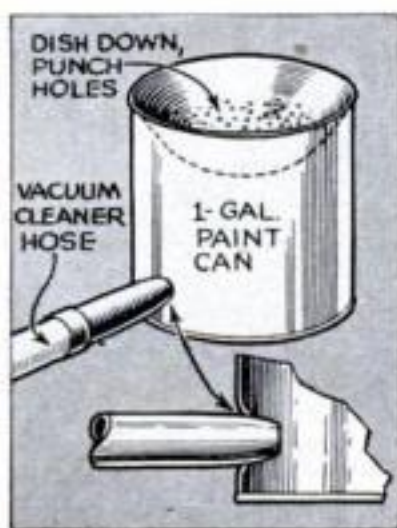
To use, put the disk in the pail, add warm soapy water, toss in the clothes, and work the plunger up and down for a few minutes. —Hubert V. Coryell, Pasadena, Calif.



Screw Tightens Hose Clamp

FOR quick initial engagement, this hose clamp uses a hinge principle. When the screw is swung out, the free end of the clamp is inserted and pulled through finger-tight. Then, for fast take-up after the clamp is in place, the gear-type screw is tightened. The clamp may be installed before or after hose assembly. It's made in five sizes by the Actus Corp., Mt. Vernon, N. Y.

Vacuum Cleaner Blows Forge



FOR hammering out small pieces of hardware, you can assemble a satisfactory forge from a 1-gallon paint can and your wife's vacuum cleaner. Dish in the end of the can and punch it full of holes. Cut a hole in the side to fit the tapered end of the vacuum-cleaner extension hose. Place the

hose close to the exhaust outlet of the cleaner adjusting the position for the air volume needed. Connect the hose directly to the outlet if you want a strong blast. Make a small fire with soft coal and charcoal. —A. A. Abbatiello, Oak Ridge, Tenn.

The Height of Ingenuity



Cleaning the bottom of my cabin cruiser was always an expensive operation until I hit on this method. Now, instead of hauling the boat out of the water, I clean the bottom while the boat is at anchor. What do you think I do?

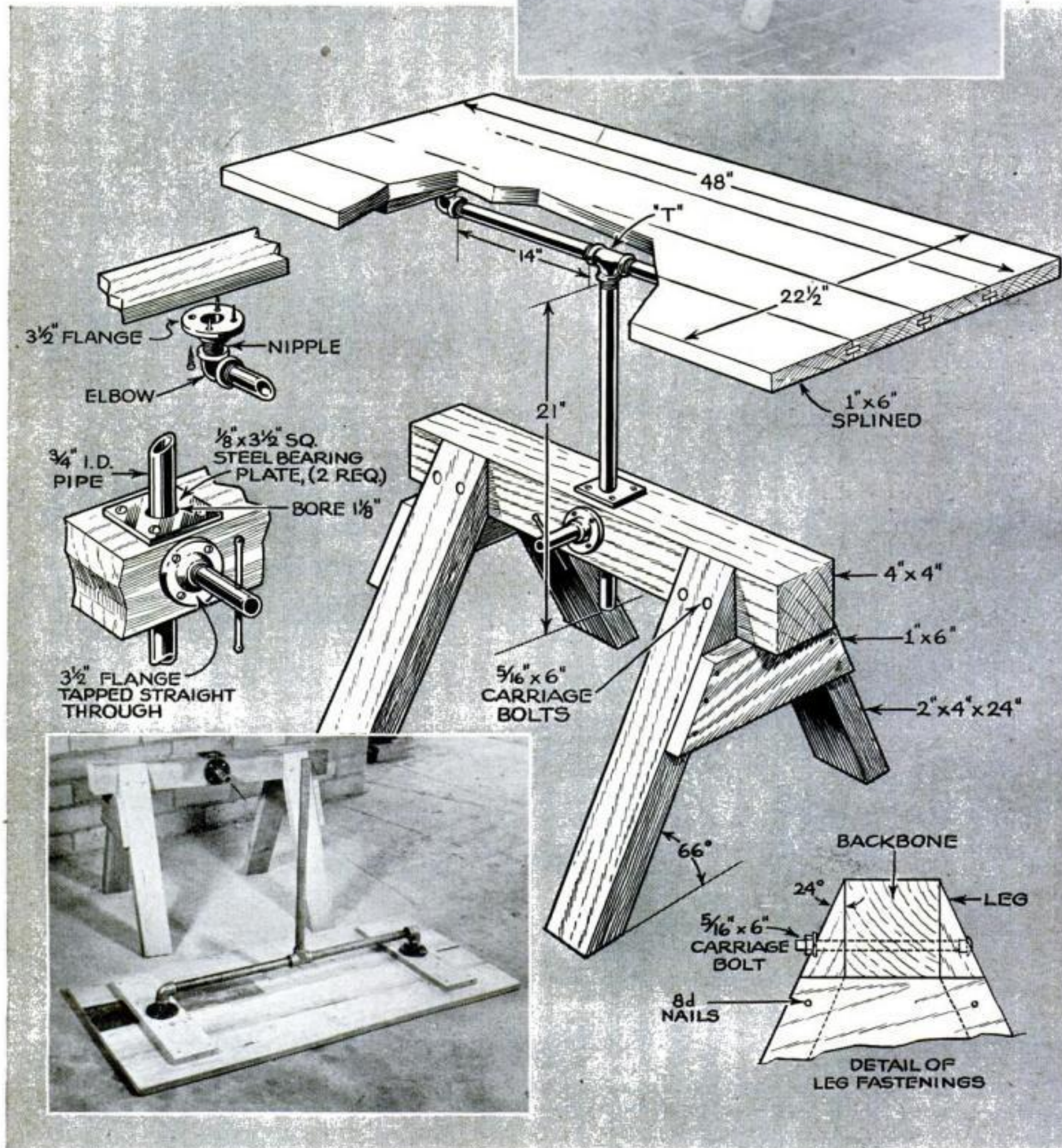
Across the top of a stiff-bristled, street-sweeper's broom, I lash a big, empty can. The can is tightly stoppered so no water can enter. Then I climb into a small boat and scrape the bottom of the cruiser with the broom. The air in the can forces the broom up against the bottom of the boat. —P. C. Pfeiffer, Great Neck, N. Y.

Split Carton for Photo Tray

Cut lengthwise down along the middle, milk cartons will quickly provide you with a set of emergency photo trays for processing $2\frac{1}{4}$ " by $3\frac{1}{4}$ " or smaller contact prints. —Isaac Frank Garcia, Manhattan, N. Y.

Shop Table Handles Many Jobs

Table is easily portable for jobs indoors or out. At right, it's being used as a workbench for a screen repair and repainting job.



By Roland Cueva

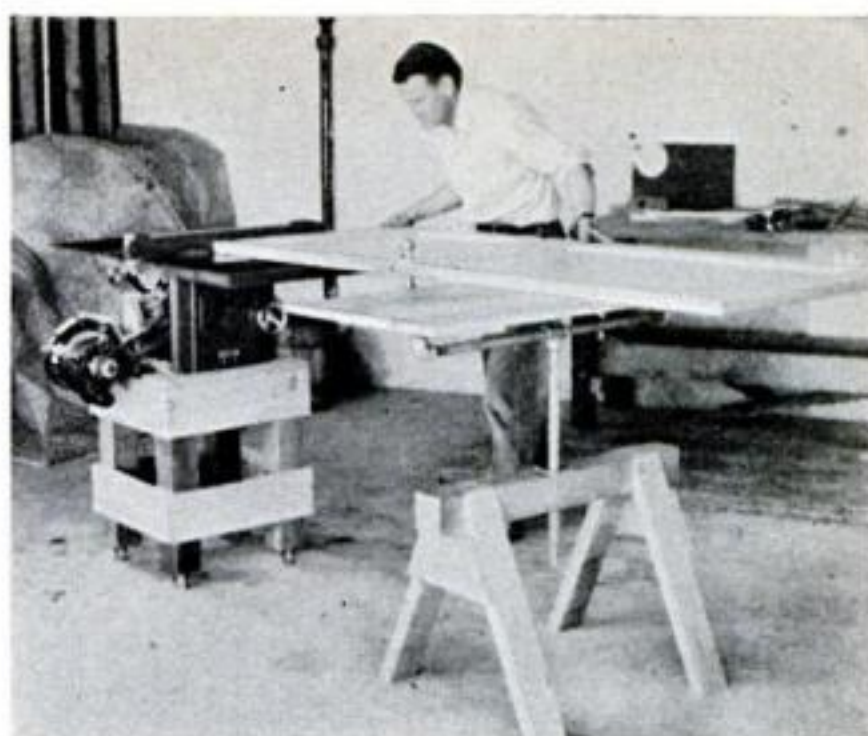
HERE'S a sawhorse that's more than just a horse. You'll find it's a regular mule for work around your shop. The table top is adjustable in height from 27" to 45". A powerful pipe clamp holds it in position. With it set to bench-saw height, you can handle large work singlehanded. Or you can use it for a gluing and assembly table, an auxiliary workbench, for cutting patterns, painting, and wallpapering. Move it outdoors for back-yard barbecues. Or remove the top and you have a fine sawhorse.

Cost of materials runs about \$6, including pipe and fittings. The lumber need not be new and is all standard size—one-by-six, two-by-four, and four-by-four. Start by gluing up four 1" by 6" boards 4' long for the top. They should be splined or doweled together for strength. Two cleats are screwed to the underside of the top.

The backbone of the unit is the four-by-four to which the two-by-four legs are bolted. The top ends of the legs are cut to a 24° angle and the bottoms to 66°. A 1" by 6" gusset is nailed to each pair of legs.

Take care when drilling the 1½" vertical and horizontal holes. These must be absolutely plumb or the table won't be level. The pipe must fit snugly in the holes in the bearing plates, yet must slide without binding. A welding shop made up the plates for the table pictured here for 50 cents.

The pipe flange that's screwed to the



In your workshop, table is like extra pair of hands in handling long work. Here it's supporting one end of door that's being trimmed.

side of the four-by-four must be tapped through to remove the taper in the threads. A short piece of pipe—threaded on one end—and the ¼" iron rod complete the clamp.

A plumbing shop can supply all the pipe and fittings for the underside of the table top. The flanges, nipples, and elbows are put together first. Then the two horizontal pipes are turned into the elbows. These should be 15" long, including the threads. After these are turned into the T, thread the standard into the bottom of the T. Turn up all joints as tight as possible. The whole assembly then is placed on the underside of the table and the flanges screwed to the cleats.

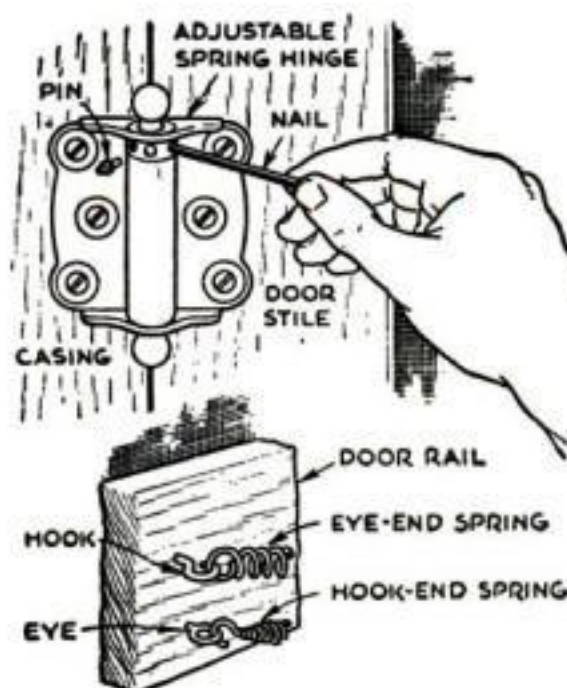
END

SCREEN DOORS

Screen and storm doors often do not close properly because their spring hinges lack the necessary tension. Hinges are adjustable for tension if they have holes around the collars. Insert a nail in a hole and turn the collar until the stop pin is freed. Replace the pin in a hole farther from the nail and allow the collar to turn back.

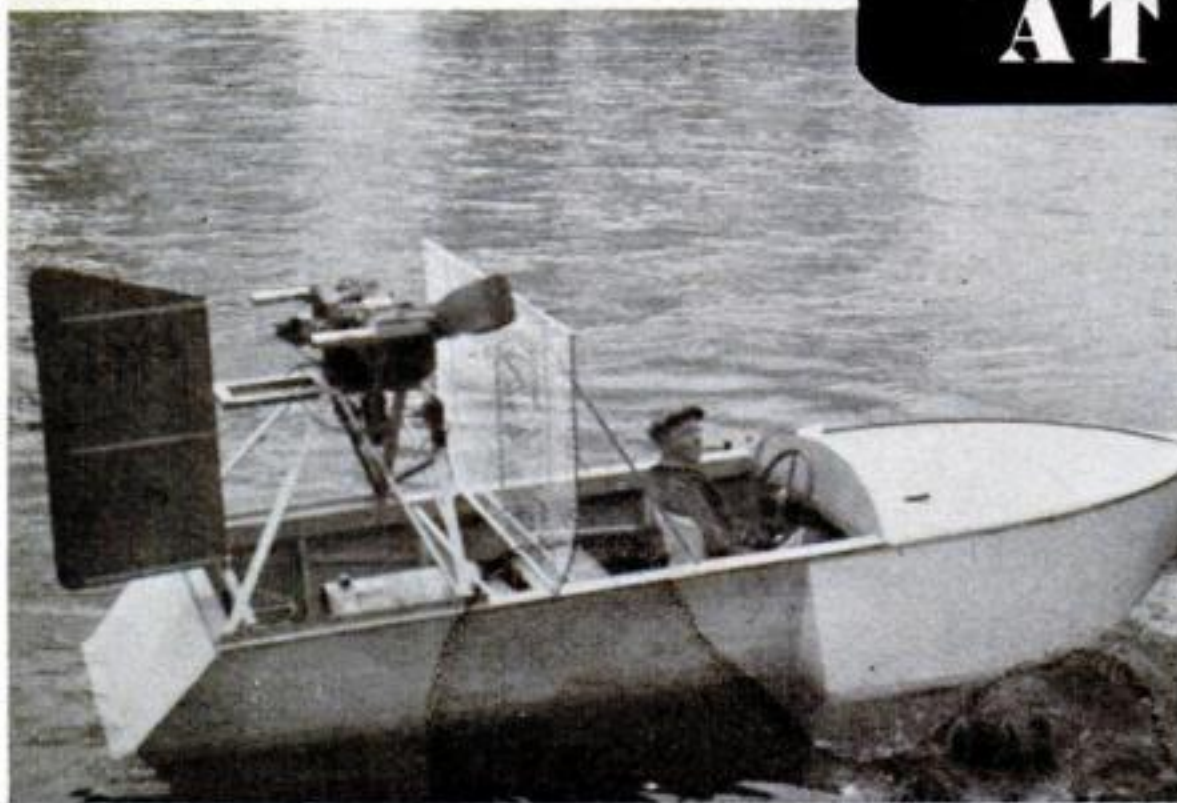
If the spring is broken or too weak, replace the hinge or install a screen spring inside the door, maintaining some tension even with the door closed. Be sure to turn the hook openings downward or inward to keep them from catching and tearing clothes.

A spring installed at the top of the door helps if the upper corner is sprung. To remedy the tendency of old doors to bow, install an inexpensive butt hinge at the center

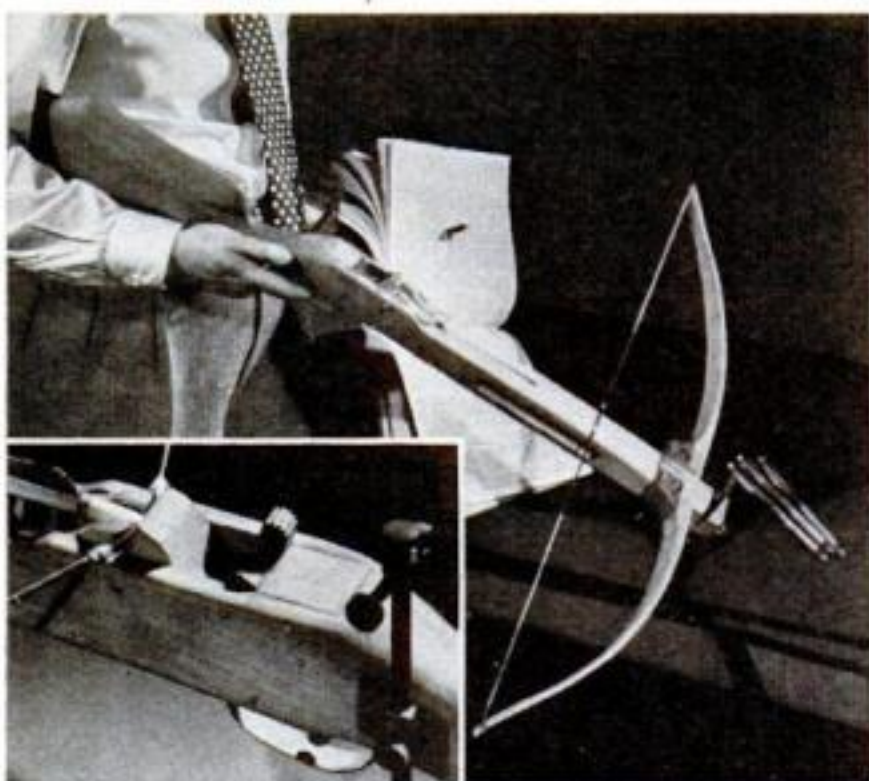


FOR YOUR POPULAR SCIENCE INFORMATION FILE

CRAFTSMEN AT WORK



Prop Powers Rapids Crasher. Air power rockets this 16' speedboat over the water at speeds up to 48 m.p.h. A light airplane engine and a paddle-blade prop furnish the push. The engine is flanked by an air rudder and a protective screen. L. R. Kauffman, of Grants Pass, Ore., built the boat to run rapids and navigate water too shallow for an outboard.

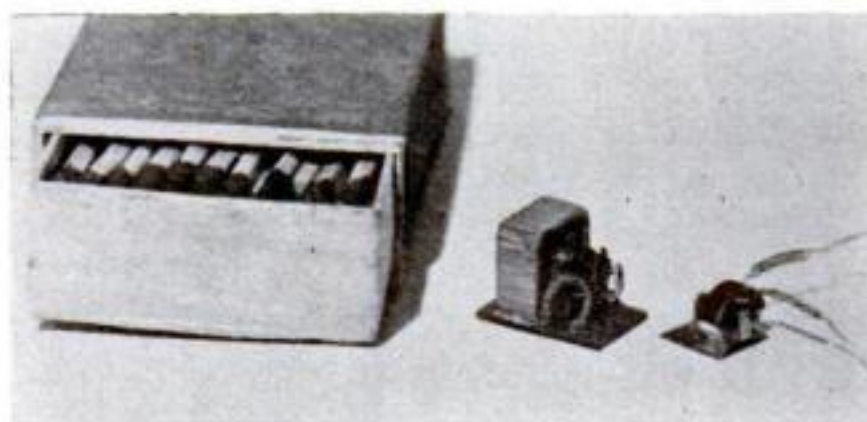


Crossbow Hits the Bullseye.

This target crossbow shoots an arrow with enough force to rip through a thousand-page phone book. It was built by Tracy L. Stalker, of Flint, Mich., who has this to say about the bow's accuracy: "Shooting from a muzzle and elbow rest, I have repeatedly made 1-inch 3-shot groups on my 45-foot home range."

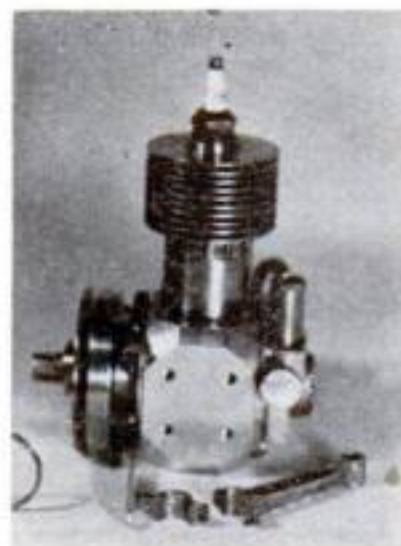
A special feature is a safety block that engages automatically when the bow is cocked. The bolt can't be fired until the safety is flipped to off position. The rear sight is adjustable for windage and elevation. No jack or other mechanical device is used in drawing the string.

The stock and lock mechanism are carved from walnut, maple, and mahogany. The bow is laminated from strips of osage orange, hickory, and maple.



Tiny Motors. Two new candidates for the title of world's smallest motors are pictured above. The mammoth object on the left is a penny matchbox. Johann Schoissengeier, of Karlsruhe, in the U. S. Zone of Germany, made both motors. He reports that the larger one weighs 1/15 ounce and runs at 3,000 r.p.m. on 1 volt AC or DC. The smaller motor is said to weigh 1/50 ounce, needs 1/2 volt, and delivers 4,000 r.p.m.

Builds PS Engine. William Bowker, of Cedar Rapids, Iowa, built the midget gasoline engine pictured below. Bowker devoted about 350 working hours in a high-school machine shop to the job. It was made without castings, has a compression ratio of 15 to 1 and a speed of 13,000 r.p.m. The crankshaft is mounted on ball bearings. Plans came from PS of June, July, and August, 1946.



New KODAK SKYLIGHT FILTER—Warm up your color scenes, taken in open shade and on overcast days, with this new filter. (Requires no change in normal exposure.) Also decrease bluish cast in mountain and marine color pictures, snow scenes, distant landscape shots. Available in series IV, V, VI, VII, and VIII Kodak Combination Lens Attachment sizes, as well as in 2-inch and 3-inch gelatin film squares.

For regular black-and-white shots, you'll find the medium yellow KODAK FILTER K-2 just what the picture ordered. The K-2 puts the *right tone* in blue sky, pops up clouds, and cuts haze for *clearer* shots.

Put SNAP
in your Shots
with
**KODAK
FILTERS—**
for color and
black-and-white

For even more vigor and contrast in black-and-whites, it's the deep yellow KODAK FILTER G. You'll get beautiful results in seascapes, where it darkens both sky and water. Also excellent for striking studies of architectural subjects.

For improving shots of green foliage, you'll like the KODAK FILTER X-1. Emphasizes clouds and foliage in black-and-white pictures without altering rest of scene.

And for the most dramatic shots of all, it's the red KODAK FILTER A. It darkens blue skies with a startling effect. And with *Infra Red Film* you'll get the most amazing pictures you ever saw—white foliage, black skies—terrific contrast!

Kodak Filters described above, in series sizes, from \$1.60. See them at your Kodak dealer's.

**Eastman Kodak Company
Rochester 4, N. Y.**

Kodak
TRADE-MARK

Before you buy any POWER TOOL

get the facts



Free 16-page booklet on SHOPSMITH brings you complete details and specifications. Send coupon below.

YOU HEAR LOTS OF TALK nowadays about multi-purpose power tools. And no wonder! The largest selling power tool in America today is a multi-purpose tool. It's SHOPSMITH!

SHOPSMITH OUTSELLS BECAUSE IT OUTPERFORMS. With SHOPSMITH you can do more jobs, actually do better work, than with any \$500 combination of saws, sanders, lathes and drill presses. Yet SHOPSMITH, complete with motor, costs only \$199.50 (without motor, \$169.50).

SHOPSMITH OFFERS YOU: Hairline accuracy. Tremendous capacity. Quality features found only in the most expensive professional-type tools. Important savings in money and space.

YOU GET ALL THESE ADVANTAGES with SHOPSMITH. And while it may take as much as *one minute* to change from one tool to another, you can often save *hours* on any one job.

THAT'S BECAUSE SHOPSMITH IS VERSATILE! You have the proper tool, simplified adjustments and ready-made jigs for difficult or unusual operations, many of which are impossible with single-purpose tools. Yes, you actually save time with SHOPSMITH!

YOU GET THE FACTS—complete, detailed specifications—in an attractive, 16-page, illustrated booklet. It's free! Your nearest Montgomery Ward, leading department or hardware store presents SHOPSMITH for your inspection. Send the coupon today for the facts! Then see SHOPSMITH and compare!

SHOPSMITH, Dept. 126-A, at factory nearest you
12819 Coit Rd., Cleveland 8, Ohio, OR
417 Montgomery St., San Francisco, Calif.

Please send me a free copy of the SHOPSMITH booklet. And tell me where I can see SHOPSMITH demonstrated.

Name _____

Address _____

City _____

Zone _____ State _____

Gus Earns a Holiday

[Continued from page 173]

motor. "That gasket come with the block?" he asked.

"No, we bought that. Dave got it down at the crossroad service station."

"Mr. Littlefield," said Gus, "I think we've stumbled on your bum main bearing." He grinned as he picked up the gasket. "Got a sharp knife and a file?"

Puzzled, Ken and Dave watched the old garageman go to work on the gasket, as he carefully enlarged each hole that fits over the cylinders about a quarter inch. Then, putting the gasket back into place on the motor block, he said, "Now let's get that head back on and see what happens."

Still puzzled, Dave and Ken did as directed.

"Now start her up," said Gus when they had pulled the last bolt up tight.

Ken stepped on the starter and all three cocked their ears toward the hood. There wasn't a sour note. The engine purred. Ken raced it, still no noise. He idled her down, not even a tiny knock.

"Well, I'll be darned," exclaimed Ken as he switched off the ignition and slid from under the wheel. "Purrs as purty as a kitten. But I still don't get it."

"Frankly, I didn't get it either," admitted Gus, "until I saw that gasket. Then I knew you'd made the understandable mistake of not realizing that a regular size gasket doesn't always go well with rebored cylinders and over-size pistons. That gasket had just enough of a lip extending over the rims of the rebored cylinders to be hit by the pistons everytime they came to the top of their stroke. The result—a noise that sounded like a knock."

As Gus drove back to town late that night, he was pleasantly happy and pleasantly tired. He'd had good fishing, he'd had an extra-special dinner, and he'd been able to help the Littlefields out of a spot. What more, thought Gus, could he want? **END**

Ever Count Your Car Springs?

SOME modern cars contain more than 400 wire springs. One maker lists 265 in the seats, 16 on the engine valves, 11 in the carburetor, 8 in the clutch, and others in the door locks and handles, master cylinder, horn button, and other parts. The tiniest is in the carburetor. It's so small it takes 125 of them to weigh an ounce.

"THEY KEEP YOUR FORD ALL FORD"



I WONDER HOW MANY FORD OWNERS KNOW WHAT I LEARNED TODAY.



I WAS TALKING TO MY MECHANIC ABOUT THE FINE CARE HE'S BEEN GIVING MY FORD AND DISCOVERED A BIG REASON WHY.



HE TOLD ME HE ALWAYS USES GENUINE FORD PARTS BECAUSE THEY'RE EXACT DUPLICATES OF THE PARTS IN MY CAR.



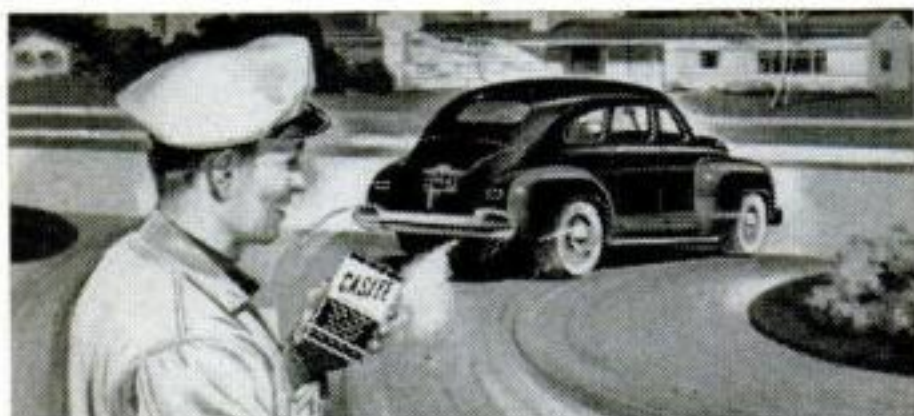
"THEY'RE MADE RIGHT TO FIT RIGHT TO LAST LONGER," HE TOLD ME "THEY KEEP YOUR FORD ALL FORD."

"IF ALL FORD OWNERS KNEW HOW MUCH TIME, MONEY AND SATISFACTION THEY GAIN — THEN THEY'D ALWAYS SPECIFY GENUINE FORD PARTS!"



AVAILABLE WHEREVER YOU SEE THIS SIGN AT ALL FORD DEALERS — AND SELECTED INDEPENDENT GARAGES

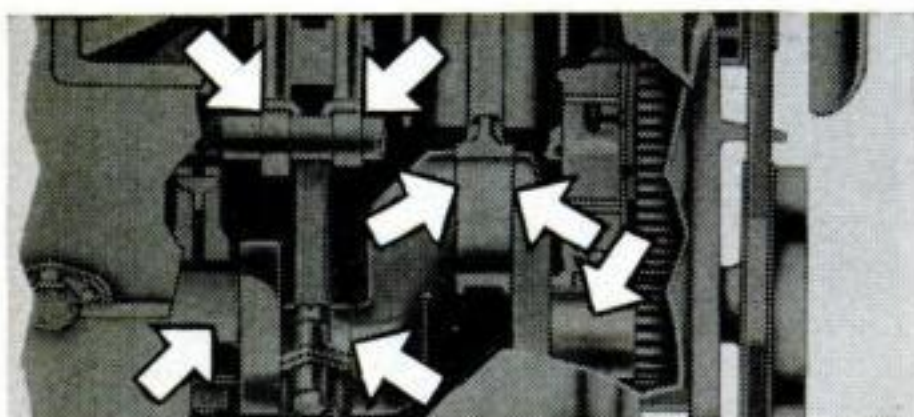
NEW LIFE FOR OLDER CARS



Get a Casite Treatment for your car today—it's simple, quick, inexpensive.

A pint of Casite through the air-intake frees sticky valves and rings, lets the power zoom through. A second pint of Casite in the crankcase oil keeps your engine clean and free-running, retards formation of sludge and gum.

LONG LIFE FOR NEW CARS



Casite assures a protective film of oil on all vital parts

Casite cuts engine wear by speeding lubrication. Even in summer, finest oil is "cold" for the first few miles, must warm to 210°F to reach top efficiency.

Yet add Casite to the oil and its flow is speeded 22% at 100°F (more when colder). A protective, wear-resisting film of oil reaches all moving parts faster, greatly reducing "start-up wear."

BETTER AND SMOOTHER PERFORMANCE *or Double-Your-Money-Back*



List Price 75c a Pint

THE CASITE CORPORATION • HASTINGS, MICHIGAN

Mechanics of Farming



By Ladd Haystead

■ Rotary tillage has interested agricultural engineers for over a generation because this method of seedbed preparation does all necessary operations in one pass over the ground. However, one drawback has limited the market largely to home and commercial gardeners--the rapid wear caused by the shock of the spinning tines hitting stones and other obstructions. Cushions, slipping clutches, rubber bumpers, and shock absorbers of various designs have been tried out with some success, but not with entire satisfaction. Now, from Rototiller, Troy, N.Y. comes a substitute for the tines --a solid, shockproof cutaway disk.

■ A new four-wheel-drive tractor, the Power Horse, with the pulling power characteristic of a track-type tractor, is announced by the National Implement Co., New York. Instead of a steering wheel, it has two handles that make it possible to ride on a drawn implement or wagon, as shown



in photo, and steer by reins as in driving a team. Machine is made in Stockton, Calif.

■ Dutch elm disease can kill a healthy tree in two weeks, and has decimated some of the most beautiful wooded sections of the East in recent years. A new drug, Carolate, developed by Prof. Frank Howard, of the Rhode Island Agricultural Experiment Station, promises a cure. The drug is a mixture of four chemicals to be spread on the ground under the trees and watered in. It neutralizes poisons that the elm fungus

Learn **RADAR** and **ELECTRONICS**



AIRMEN WATCHING AIRCRAFT THROUGH RADAR SCOPES

And Earn Good Pay While You Learn **IN THE U. S. AIR FORCE**

Never before in history has there been such a wealth of opportunity for qualified men in radar, radio, electronics, weather, and other fascinating career fields, as in the U. S. Air Force today. You are trained in the field where your possibilities of advancement are greatest, and you earn full pay while you learn! Inquire today about the many advantages you are offered in the new Airman Career Program.

U. S. AIR FORCE

VISIT YOUR NEAREST AIR FORCE BASE
OR U. S. ARMY
AND U. S. AIR FORCE
RECRUITING STATION



A Few of the Many **AIR FORCE CAREER FIELDS** Now Open to You

RADIO AND RADAR MAINTENANCE
AIRCRAFT AND ENGINE MAINTENANCE
AIRCRAFT ACCESSORIES MAINTENANCE
INTRICATE EQUIPMENT MAINTENANCE
WEATHER
ARMAMENT SYSTEMS
FOOD SERVICE
TRAINING DEVICES MAINTENANCE
AIR TRAFFIC CONTROL AND WARNING
WIRE MAINTENANCE
MISSILE GUIDANCE SYSTEMS
COMMUNICATIONS
OPERATIONS
PHOTOMAPPING

**NO CAR SHOULD BE
WITHOUT ONE!**



CASCO VIS-O-LITE

Illuminated Automatic

CIGARETTE LIGHTER

Why be without the convenience of this great new Vis-O-Lite illuminated lighter that makes driving safer day and night? You can replace your old lighter with a new Vis-O-Lite in a matter of minutes with pliers and screwdriver . . . and get the advantages of an illuminated lighter—well that ends fumbling in the dark, prevents scratching dashboards. Made by the manufacturers of the original pop-out lighter that's standard equipment on 4 out of 5 cars. Costs only **\$2.75** complete. The illuminated well-assembly alone (minus the pop-out unit) costs only **\$1.25**. Now on sale at Car Dealers, Auto Supply Stores and Service Stations.

**NO HOBBYIST SHOULD
BE WITHOUT ONE!**

CASCO ELECTR-O-TOOL



*Does More
Costs Less!*

25
piece set

\$14.95

The most complete, practical power-workshop any craftsman or hobbyist can own. Absolutely an essential for Model Train Builders! Has ALL the accessories you need to drill, cut, etch, carve, grind, buff, sand, engrave, saw and sharpen—metal, wood, glass, leather, plastic and fibre. 1001 year-round money-saving uses. Operates on AC and DC current. Fully **GUARANTEED**.

Now on sale at Department, Hardware, Appliance, Auto Accessory and Jewelry Stores.

CASCO PRODUCTS CORPORATION
BRIDGEPORT 2, CONNECTICUT

CASCO



Mechanics of Farming

spreads into a tree's sap stream, and at the same time revitalizes the tree. It also acts as a preventative on the spread of the disease to uninfected trees.

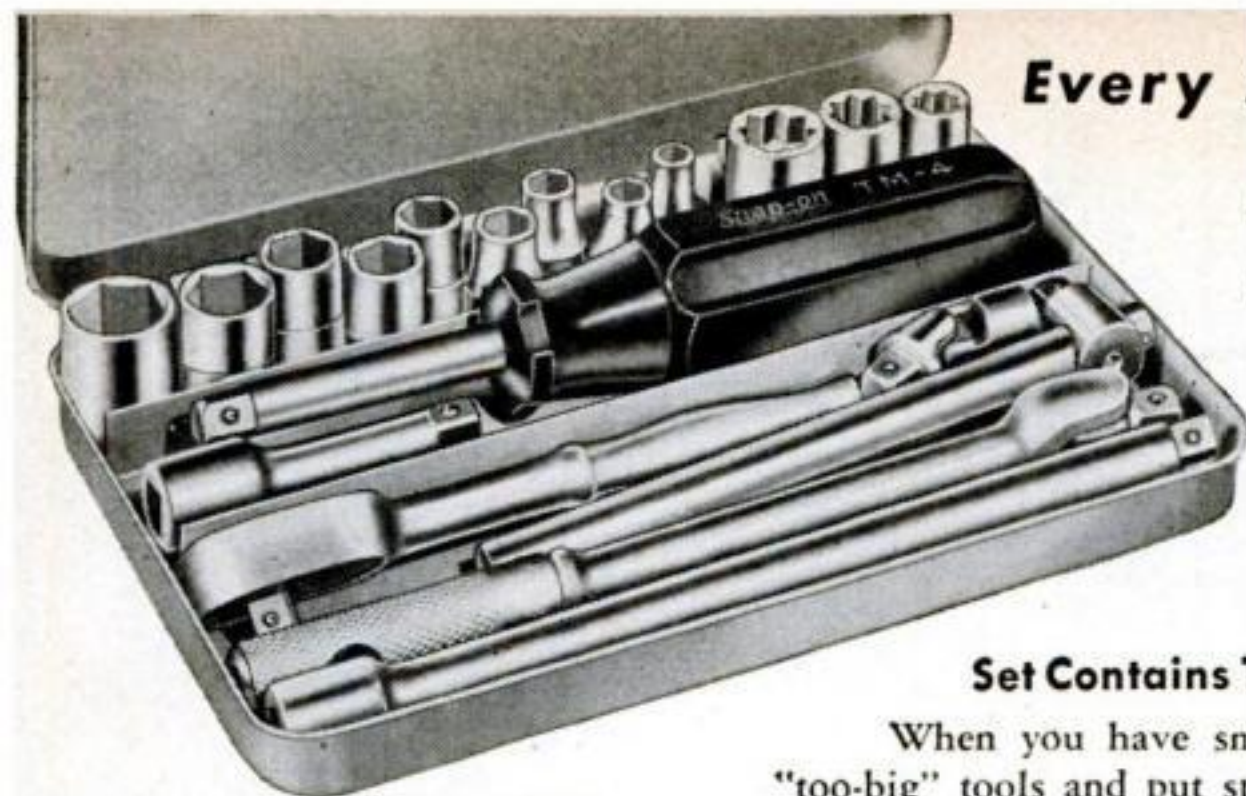
■ Paper from southern pine is fast becoming the chief industrial product of the South. In 1950 the industry will employ 120,000 workers, pay over \$100 million dollars to owners of small woodland tracts, mostly farmers.

■ Agricultural machines don't always succeed, reminds the Illinois College of Agriculture in reporting that stalk cutters thought to control the corn borer are failing at the job. After extensive tests of existing machines, it was found the best ones left 30 percent of the stalk uncrushed. That leaves plenty of places for the borers. Only clean plowing gives adequate control.

■ Hay can be put up the same day it is cut by using a new 'conditioner' announced by the Meyer Mfg. Co., Morton, Ill. While the power mower is cutting a swath, the row previously cut is picked up by a rotator and drawn through the conditioner, which splits the stems and aerates the material. Experiments, says the maker, show drying time is 30 to 50 percent less and carotene content up 300 percent.

■ American agriculture is the most mechanized, most efficient in the world. Yet, agronomists are worried over declining yields in many sections, due, it is believed, to decreasing stores of plant food. This means that the use of fertilizer, already several times greater than prewar, must go still higher. Machines don't make manure.

■ Although large commercial pea viners have been around a long time, no machine has been available for use on small experimental plots. Due to rapid changes in vitamin content and other quality characteristics, slow hand-harvesting methods have hampered experimental work. Now, the U.S. Plant, Soils, and Nutrition Bureau (Beltsville, Md.) has developed a small gas-engine machine that can thrash a 50-foot plot in 4 minutes.



Every Mechanic Needs a

Snap-on*

MIDGET WRENCH SET

for small assembly work

Set Contains These 19 Most Needed Wrenches

When you have small nut-turning jobs, lay aside those "too-big" tools and put speed, safety, and working convenience into your hands with this 19-piece Standard Midget set. You get a Nut Spinner, 2" and 6" Extension Bars, Ratchet, Plastic Grip Handle, Sliding Bar, Universal Joint, nine hexagon sockets (3/16" to 1/2") and three square sockets (1/4" to 3/8").

*"Snap-on" is the trade mark of Snap-on Tools Corp.

\$17⁷⁵

Plus Local Sales Tax



SNAP-ON TOOLS CORP., 8062-D 28th Ave., Kenosha, Wis.

Please send me the 119-TM-B Midget Standard Set

I enclose ☐ Check, ☐ Money Order,
☐ Company Purchase Order.

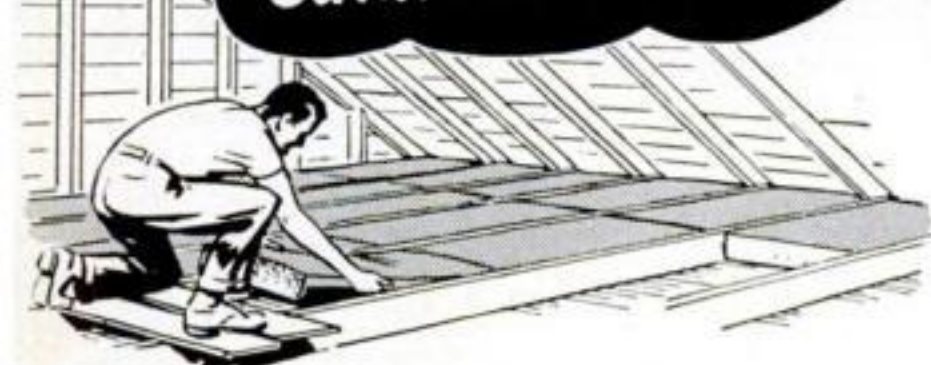
NAME.....

ADDRESS.....

CITY.....STATE.....



**WANT QUICK
RELIEF FROM
SUMMER HEAT?**



YOU can beat the hot weather by insulating your attic with Gold Bond Rock Wool Insulation. Lightweight, easy-to-handle Sealed Blankets or Enclosed Batts come in standard widths, fit snugly between attic floor joists or roof rafters. Fireproof...it can't burn. Keeps summer heat out, furnace heat in...pays for itself in fuel savings. Get Gold Bond Rock Wool Enclosed Batts in 2 ft. and 4 ft. lengths. Sealed Blankets are 8 ft. long. Be sure they're "full-thick"—and be sure they're Gold Bond for best results. Write for free booklet to Div. Y, Dept. PS-7.

*Available at your local Gold Bond
lumber and building materials dealer!*

**NATIONAL GYPSUM COMPANY
BUFFALO 2, NEW YORK**

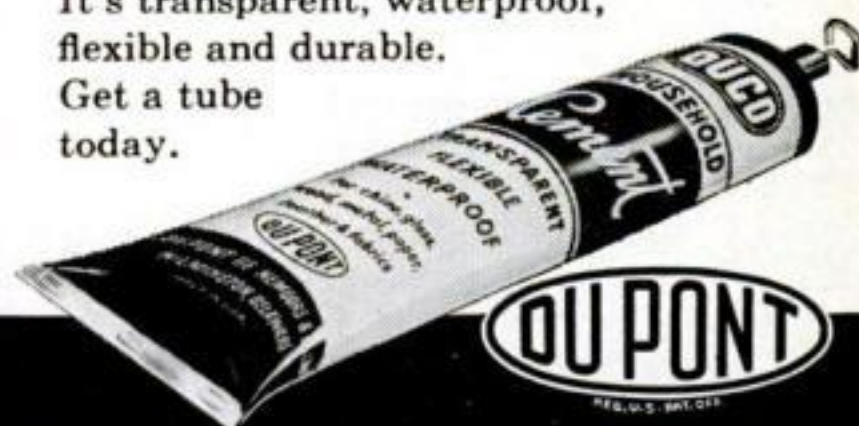


**"SAVE IT AND
FIX IT"**

REPAIRS

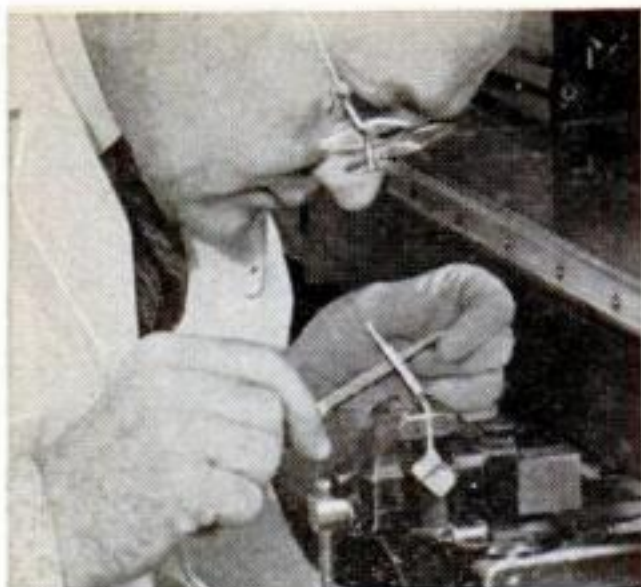
**CHINA, TOYS, FURNITURE
BOOKS AND LUGGAGE**

It's transparent, waterproof,
flexible and durable.
Get a tube
today.



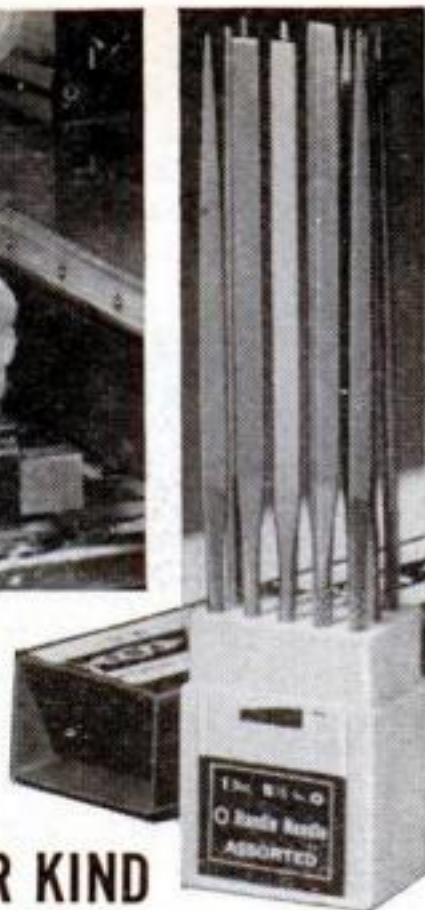
DUCO CEMENT

REG. U. S. PAT. OFF.



SWISS PATTERN FILES of the BETTER KIND

for every type of precision filing



WHEN fits and tolerances resolve themselves into denominators of thousandths, the files used on the work must be right for precise filing. Nicholson X.F. (Extra Fine) Swiss Pattern Files are widely regarded as the finest you can buy. They cover practically every need of the tool, die, pattern, model, watch, clock, jewelry and fine-instrument maker.* Their accuracy and general high quality are outstanding in these primary essentials:

SPECIFIED HIGH CARBON STEEL that is carefully inspected for proper grain size, and maximum hardenability and uniform performance.

UNIFORM TOOTH STRUCTURE—assured by most modern file-making machinery.

SOUND TEETH TIPS capable of high hardening—the result of cutting only after file blank has been ground and drawfiled to remove every trace of surface decarburization.

UNIFORM HARDNESS AND STRAIGHTNESS to aid long life and accurate filing.

*Illustrated above is the famous Nicholson kit of twelve assorted X.F. Swiss Pattern Round Handle Needle Files—pride of the hobbyist and precision craftsman. Plastic box, with bottom stand, is in beautiful orange-and-blue design. At good hardware stores everywhere.

FREE BOOK, "FILE PHILOSOPHY"—48 interesting illustrated pages on kinds, use and care of files. Write to—

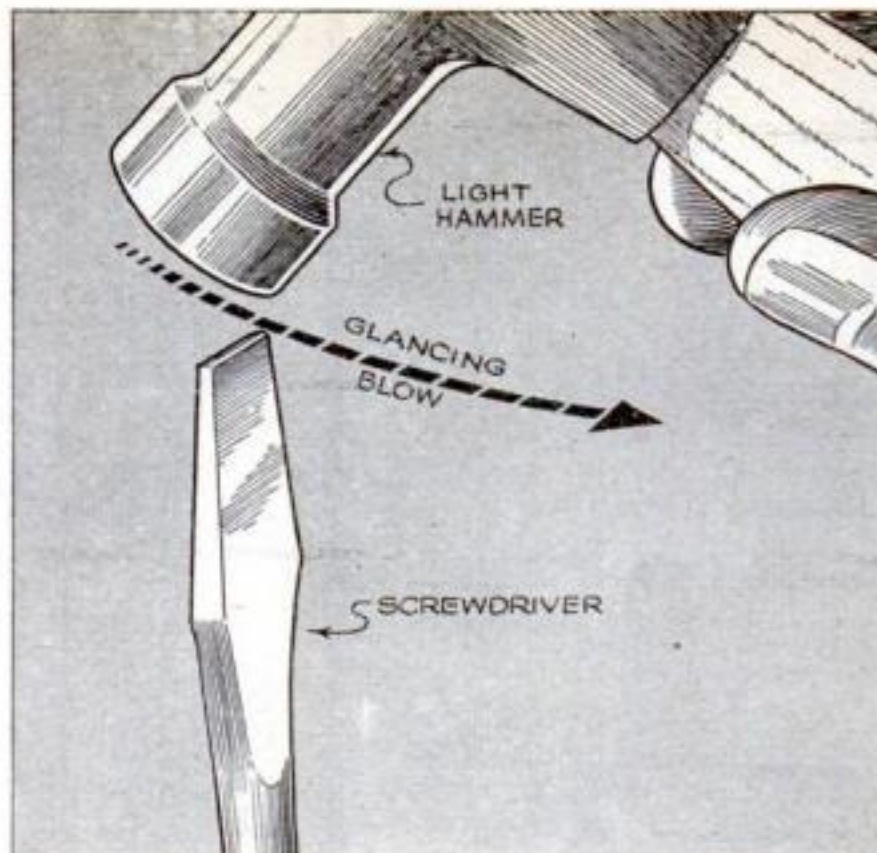


NICHOLSON FILE CO.
19 Acorn St., Providence 1, R.I.
(In Canada, Port Hope, Ont.)



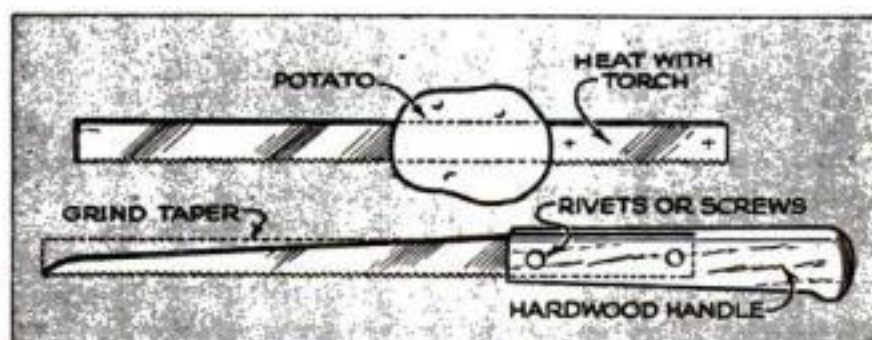
NICHOLSON FILES

FOR EVERY PURPOSE



Broadened Tip Grips Screws

You can put a gripper tip on a screwdriver in a couple of seconds. Knowing how may save your time and temper on many jobs. Select a screwdriver that is the right size and hold it with the tip up. Strike it a few glancing blows with a hammer, then turn the driver half around and repeat. This puts two sharp beads along the edge of the tip, giving it the gripping action you may need to get a screw into a difficult spot.—*Arthur R. Christensen, Lockport, N. Y.*



Saber Saws from Old Bandsaw

A HAND saber saw is one of the most useful tools you can add to your woodworking equipment. You can make one out of a discarded bandsaw blade.

Break the blade into 8" lengths, and slip a raw potato over one end as shown. Heat the end in a flame until it turns cherry red. Let it cool slowly and drill rivet holes in the annealed metal. Shape the handle from a scrap of hardwood, slot one end for the blade, and rivet or bolt it in place. Then grind the back of the blade to a taper.

The potato is an effective heat shield. It protects the working part of the blade from heat and allows you to hold the free end without discomfort.—*Dick Hutchinson, El Monte, Calif.*

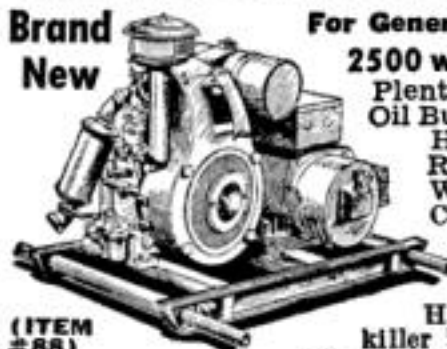
GROBAN'S WAR SURPLUS SPECIALS

ALL
ITEMS
BRAND NEW

AUXILIARY ELECTRIC GENERATING PLANT

Brand
New

For General Utility and Emergency Use



(ITEM
#88)

2500 watts—115 volts—60 cycles A.C.
Plenty of current to operate your
Oil Burner, Sump Pump, Refrigerator,
Home Freezer, Power Saw, Lights,
Radio and Television, Home
Water System Pumps.

Complete integrated heavy duty elec-
tric power plant, Signal Corps
Model PE-75, driven by Briggs
& Stratton one cylinder 6 1/2

H.P. Model ZZ, 4-cycle engine with
killer button, oil bath air cleaner, gover-

nor, muffler, starting rope, and radio inter-
ference filter. The self-excited Leland or Westinghouse generator is
rated 2500 Watts, 115 Volts, 60 cycle A.C. single phase, belt driven,
with guard and duplex receptacle. When generator is not in use, you
can use the engine separately to power other equipment. Mounted on
adjustable steel skids, notched for carrying poles.

Net wt. 310 lbs. Shpg. wt. 440 lbs. Dimen. 36" x
19 1/2" x 24". 12 month guarantee. \$726.00 value.
NOW F.O.B. Chicago.

295.00



(ITEM #63)

G-1 Stainless Tank

Use these tanks on compressors, for tire
inflators, pulsation chambers, floats, buoys,
hydraulic reservoirs, fluid and milk con-
tainers, fuel containers, etc. Tough, light,

450 P.S.I. Aviators Breathing Oxygen bottles, type
G-1, 2100 cu. in. (approx. 9 gallons) int. vol.
24" x 12". 1/4" threaded openings at ea. end. Wt. 19
lbs. F.O.B. Chicago.

4.95

Aircraft Quality HYDRAULIC CYLINDERS

Large supply of new labor-saving, economical hydraulic equipment in many types
and sizes . . . including double action cylinders, control valves, tanks, pumps,
fittings, hose, and data on hydraulic applications. Use these positive, highly effi-
cient, smooth pressure hydraulics on presses, arbors, lifts, loaders, power control,
positioning, brakes, plastic dies, auto frame alignment, etc., etc.



(Item
#42)

ITEM #4—All steel double action hydraulic cylinder, 1 1/2" bore, 2 3/8"
stroke. Clevis mounting. Will lift 1000 lbs. with 1000 P.S.I. line
pressure. Perfect for positioning and feeding movements. Shpg.
wt. 4 lbs. F.O.B. Chicago.

4.95

ITEM #33C—Double action hydraulic cylinder, 1 1/2" bore, 4 1/2" stroke.
Clevis mountings at both ends. Uses 1/4" pipe fittings. Postpaid

8.95

ITEM #32—Double action, 1 1/2" bore, 9" stroke, will lift 1760 lbs. with
1000 P.S.I. line pressure. Wt. 4 lbs. A \$45.00 value. Postpaid

10.95

ITEM #41—Double action hydraulic cylinder, 2" bore, 6" stroke,
clevis mounting at base and end of shaft. Overall length closed
12 1/2". Has 3/4" stainless steel shaft, uses 1/4" tubing fittings. Will
lift up to 3100 lbs. with 1000 P.S.I. line pressure.

12.50

ITEM #16—Double acting cylinder, 1 1/2" bore, 27" stroke. (Will lift
1760 lbs. with 1000 P.S.I. line pressure. Wt. 8 lbs. A
\$55.00 hydraulic cylinder value for only Postpaid

12.95

ITEM #15—Double acting cylinder, 3" bore, 8 1/2" stroke. All steel
hydraulic cylinder, will lift up to 7000 lbs. with 1000
P.S.I. line pressure. Wt. 12 lbs. A \$78.00 value, Postpaid

19.50

ITEM #31—Double acting cylinder, 3 1/2" bore, 11" stroke. Will lift
9600 lbs. with 1000 P.S.I. line pressure. Wt. 15 lbs. A
\$92.00 value. Postpaid

22.50

ITEM #40—Double action, 3 1/2" bore, 20" stroke. Rated lift capacity 9600 lbs. with
1000 P.S.I. line pressure. Clevis mounting, aluminum alloy barrel with
1 1/2" stainless steel shaft and piston. Wt. 20 lbs. \$125.00 value. F.O.B. Chicago

25.00

ITEM #42—Double action hydraulic cylinder, 4" bore, 18" stroke. Rated lift ca-
pacity with 1000 P.S.I. line pressure is 12,560 lbs. Ship wt. 30 lbs.
F.O.B. Chicago. AN EXCELLENT BUY for

32.50

HI-PRESSURE FITTINGS for cylinders and valves available
at 35c ea. for 3/8" pipe and 50c ea. for 1/2" pipe.

HYDRAULIC CONTROL VALVE

ITEM #24. Four-way control valve
with built-in relief valve, for use
with one double action hydraulic cyl-
inder, may be used
with 1500 P.S.I.
hydraulic sys-
tem to open
and close
hydraulic
cylinders.
Ship. wt.
8 lbs. A
\$38 value, postpaid.

7.95

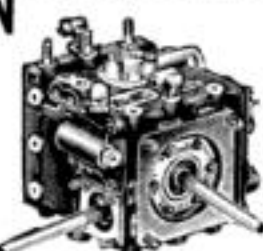
ITEM #26. Four-way control valve for use
with two hydraulic double-action cylinders.
Each cylinder may be operated independ-
ently of the other or in conjunction with
the other. Oil may be locked in any of the
cylinders to hold the piston at any required
position. Ship. wt. 6 lbs. A
\$60 value, postpaid

10.95

VICKERS HYDRAULIC TRANSMISSION

MODEL AA16801A

Ideal for lathe
drive, miniature
cars, power ma-
chinery, gearing,
etc. Rated 2 HP
maximum input at
3750 RPM. Output
speed continuously
variable from 0 to
1/3 of input speed
in either direction.
Self contained reservoir. All controls ex-
ternal. Even power at all speeds. Com-
plete with two 1/2" shafts with flat for pul-
ley attachment. Shpg. wt. 20 lbs. Gov't.
acquisition cost
\$325.00. A tremen-
dous value at



(ITEM #85)

25.00

F.O.B. Chicago

UTILITY ROTARY VANE PUMP

Perfect For Water, Oil or Insecticides
Sprays DDT, 2-4D, sulphur compounds, etc. Pressures
to 150 lbs., 15 gals. per min. at 1200 RPM using 2 HP.
As vacuum pump for milking machines, lab use, etc.,
delivers 26" vacuum, 4.5 cu. ft. per min. at 1500 RPM,
using 3/4 HP. Rotate either direction, 1/2" pipe thread
ports, 1/2" standard shaft, 4 ball bearings. Easy angle
bracket mounting—Ready to run. Shpg.
wt. 13 lbs. F.O.B. Chicago

\$16.50



(ITEM #51)

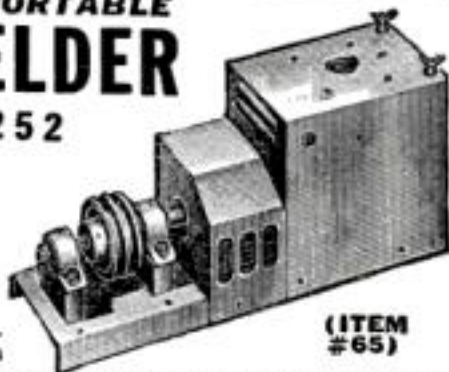
NEW! STATIONARY OR PORTABLE

D. C. ARC WELDER

250 AMPS. MODEL 252

FOR ANY WELDING JOB,
LIGHT OR HEAVY

Stop Costly Repair Bills,
Weld It Yourself and Save



(ITEM
#65)

Designed for many years of trouble-
free service. Handles anything from
light gauge sheet metal to 1/2" plate.
This precision-engineered Direct Current ELECTRIC ARC WELDER is
offered at but a fraction of its original value. It can be mounted perman-
ently or easily transported for portable use. Does the job instantly,
where and when you need it.

The War Surplus generators for these Arc Welders were built by General
Electric, Westinghouse, and Delco-Remy at a cost of over \$300.00. They are
light in weight; have oversized lifetime grease-sealed ball bearings; air-
cooled commutator; dial type rheostat for easy pinpoint control; high-low
range switch; reactor coil for even arc; handles 1/16" to 1/4" rods. Run
welder at 2500 R.P.M. from drive pulley or power take-off of tractor, a
7 1/2 H.P. electric motor or a 10 H.P. gas engine. Use two V-belts, or flat
belt (on pulley). Continuous welding rating—200 amps.; intermittent
rating—250 amps.; 0-30 volts. Now AT A FRACTION
OF ITS VALUE. Price includes double V or flat belt pulley
and instruction book. Ship. wt. 107 lbs. Only one or two jobs
will pay for entire welder. F.O.B. Chicago.

99.50

ACCESSORY KIT including welding helmet, electrode holder, two 10 ft.
cables with clamp and 5 lbs. of assorted welding rods.
(ITEM #66) F.O.B. Chicago

10.50

Remember. Satisfaction is Guaranteed

A. C. LIGHT PLANT GENERATOR

750 Watts 115 Volts 60 Cycles

Manufactured by Elcor, rated 750 watts at
1800 R.P.M. Complete with voltmeter regula-
tor; 1" shaft, with keyway for direct or belt
drive, supported by two ball bearings. These units built to exacting
Signal Corps specifications, are the answer to your
lighting needs. Shipping wt. 60 lbs. F.O.B. Chicago

(Item
#67)

59.50

PUROLATOR OIL FILTER

PERMANENT TYPE

The perfect oil filter to keep your
motor oil or hydraulic fluid clean at
all times. Protect your pump or en-
gine with this unit. Just turn the
handle and the element is clean.
Standard 3/8" inlet and outlet ports
to accommodate 12 gallons per
minute. Shipping wt. 4
lbs. A \$13.00 value.

4.95

(ITEM #70) Now

post-
paid



DIRECT CURRENT GENERATORS



For welders, plating, truck
and marine use, D.C. appli-
ances, lights, etc. Aircraft
quality—lifetime grease sealed
ball bearings. Heavy duty.

Item #89—Type M-2, rated
50 Amps.—24 Volts. Mfd. by

Leece-Neville Co. Shpg. wt. 32 lbs. Gov't.
Acq. Cost \$176.00. F.O.B. Chicago.

16.50

ITEM #90—Type P-1, rated 200 Amps.—28 Volts,
2500 RPM. Mfd. by General Electric, Ford, Delco-
Remy and Westinghouse. Gov't Acq. Cost
\$300.00. Shpg. wt. 54 lbs. F.O.B. Chicago

22.50

Item #91—Type R-1, rated 300 Amps.—30 Volts.
Mfd. by Jack & Heintz. Gov't. Acq. Cost
\$380.00. Shpg. wt. 70 lbs. F.O.B. Chicago

35.00

Each individually packed in wooden box.

LOGAN HEAVY DUTY HYDRAULIC PUMP

For operating hydraulic cylinders and
hydraulic motors on tractors, bull-
dozers, construction machinery, lift
trucks, industrial applications, etc.
Delivers 8 GPM at 1200 RPM at 1000
P.S.I. using 5 HP. Has 1/2" pipe
thread ports. 3/4" shaft with flat and key-
way for direct or pulley drive. Has
flange, with 4 bolt holes for convenient
mounting. Ship. wt. 22 lbs. Overall
dimen.: 7" L x 5 1/2" H x 5 1/4" W.
A \$105.00 value FOR ONLY



(Item
#29)

22.50 F.O.B.
Chicago

ORDER DIRECT FROM AD
SEND PAYMENT OR PURCHASE ORDER TODAY
All items unconditionally guaranteed

GROBAN SUPPLY CO.
1507 S. Michigan Ave.
DEPT PS-7
Chicago 5, Ill.

FREE: NEW 44-PAGE CATALOG

listing excellent War Sur-
plus values including gen-
erators, welders, pumps,
hydraulics, and data on hydraulic applications. Write for yours today!

New **POWER KING** 8" TILT/ARBOR BALL BEARING SAW

A New Standard of Value from **Atlas**



Has the capacity you need for any type of construction for your home. Cuts 2 5/8" deep. *Precision-ground grey-iron table, full-length rip fence, tilting/arbor, sealed ball bearings.* *Price, F.O.B. Kalamazoo, less motor, extensions, only \$54.75—\$67.75 with two extensions as shown. Send a postcard for new catalog.

ATLAS PRESS COMPANY

742 N. Pitcher St., Kalamazoo, Mich.



KING MIDGET HOME ASSEMBLED AUTO



WORLD'S LOWEST PRICED AUTOMOBILE!

80-90 MI. PER GAL.—45-50 MI. PER HR.

Drive for as low as 50c per week. Precision built parts direct from factory with beautiful all steel body. Get the facts on this amazing small auto—send 25c for detailed circular with large picture, 3 view drawings and price of all parts, or send \$1 (refunded first order) for this plus actual assembly book with 42 photos, drawings, blueprints of snow, ice conversions, information on mini-midget racing, etc.

MIDGET MOTORS MFG. CO., Athens 3, Ohio

King Midget is ideal for errands, sports use, to work, short business or pleasure trips, or second-car utility for the whole family. Also tops for mini-midget racing. Room for six footer.

MILLER ROTARY HI-SPEED ROPE SAW/DRILL-BIT IT SAWS CUTS REAMS



SAWS, CUTS, REAMS... sheet metal, angle iron, pipe, wood, plastic, Transite, etc. Amazing high speed combination bit and saw fits any 1" or 1 1/2" electric drill or slow drill press; takes place of up to \$50 in tools. Drills own starting hole to quickly cut, saw or ream opening. Easy to operate. Ideal for carpenters, auto mechanics, electricians, plumbers, hobby workers, many others. Abrasive resistant high speed steel. Will withstand severe continuous use. 1" diameter, overall length 3 1/2", cutting section 2" long with flutes ground from solid.

SEND CASH, CHECK OR M.O.

Order Now

International Twist Drill Corp. Room 695
7th & Wyandotte PS-4 Kansas City 6, Mo.

PRICE
\$3.95
POSTPAID

New Kind of Cloth Made Without Weaving

AFTER dinner, throw away your tablecloth and your napkins. And do the same with apron and dishcloths when the dishes have been dried. They're made of a new kind of cloth so inexpensive that they can be used once and then thrown away. The same material now yields expendable handkerchiefs, towels, dust and polishing cloths, babies' diapers, and decorative draperies.

These are only a few typical applications of the new "nonwoven fabrics," probably the most radical innovation in the history of textiles. Since the making of fabrics began, fibers have always been fashioned into cloth by the time-honored art of spinning and weaving—with wool felt, made from sheep's wool, being virtually the only exception. Other fibers lack natural characteristics that make those of wool intertwine, "felting" or interlocking and thus permanently bonding them together.

Today, however, artificial bonding by chemical and other means, dispensing with mechanical spinning and weaving, can create unwoven fabrics from fibers of any type—both natural and synthetic. Cotton and viscose rayon have been the materials most widely used to date. But the process is said to be equally successful with others, including acetate and Vinyon.

Fibers for unwoven fabric are first formed into a "lap" or sheet, using either textile- or paper-making machinery. Liquid plastic is then added to the sheet, binding the fibers together in one bonding process. The plastic may be applied by dipping, spraying, or printing with rollers, sometimes in parallel strips or in other decorative patterns. Another process uses blends of fibers, some of which are softened by heat to serve as a binder, with or without the supplementary aid of a chemical bonding agent. Drying, which may be done on heated rollers, follows bonding. All steps are well adapted to economical mass production.

Bonded, or nonwoven, fabrics have the feel of conventional cloth. They may be made soft or stiff, absorbent or water-repellant, as well as flame-resistant, as desired, and can be attractively dyed or printed in colors. They resemble either cloth or paper in appearance, depending on the process of manufacture, and are far more durable than paper in towels and napkins. Makers are

DREMEL'S STRAIGHT-LINE ACTION

GUARANTEES SCRATCH-FREE SURFACES

Here's fast cutting, finish sanding at its best. Dremel introduces a new electric sander, sturdily built to withstand hours of continuous use. It is light in weight... will not tire operator. Its **straight-line (non-rotary) action** leaves no scratches, no rotary marks—just satin-smooth surfaces ready for any type finish. Here, for the first time, is an electric sander built for years of faithful service—all at the remarkably low price of **only \$24.50**.

A POWERFUL, FAST CUTTING TOOL FOR CRAFTSMEN, HOME and INDUSTRIAL USERS

Craftsmen find this new Dremel model has the extra stroke and power needed for heavier woodworking projects such as cabinet-making, boat building and refinishing, garden furniture, etc. Home-owners say it's just the tool for preparing surfaces for painting and varnishing—for refinishing walls, woodwork, furniture, dry wall joints, siding and other surfaces. The Model 2000 also does a professional job of polishing waxed surfaces—eliminating all the back-breaking labor on cars, furniture, floors, stairways, etc. Industrial users likewise find this new Dremel Sander a faithful performer in furniture, cabinet, building and body shop operations.

RUGGED DESIGN and PERFORMANCE FEATURES

- Only two moving parts—requires no oiling.
- Reciprocal (straight-line—non-rotary) action leaves no marks...cannot burn surface.
- 21 square in. sanding surface speeds production...14,400 cutting strokes per min.
- Cam-type holder permits changing paper in seconds. Die-cast aluminum housing with moulded Bakelite cover...Light weight, only 5 pounds. Over-all size 3 1/8" wide, 4 1/2" high, 7" long. 8 ft. Underwriter's Approved cord...uses 110-120 v. A.C.

14,400
Sanding
Strokes
Per
Minute

ONLY
\$24.50

WITH STEEL
CARRYING CASE
AND COMPLETE
ACCESSORIES



(PATENTED)

PRICE INCLUDES STURDY CARRYING CASE

Perfect portability of Sander, cord, abrasives, and polishing pads is provided in this sturdy, 3-shelf metal storage case. Price also includes 25 assorted sheets abrasive paper and a high-grade sheepskin polishing pad.



DREMEL Model "A" SANDER-POLISHER OVER 200,000 NOW IN USE!

A lighter-capacity Sander that takes all the work out of home or hobby projects. Popular with women for polishing furniture, etc. Same design and construction features as larger model. Furnished in attractive cardboard box. If your dealer can't supply, order direct from factory.

\$14.85



DREMEL Electric COPING SAW

CUTS SCROLLS LIKE MAGIC—SANDS AS IT SAWS



Only
\$5.85

JUST
GUIDE IT!

SAFE! AS A HANDSAW

For home, hobby, repair work—no other tool pleases so much for so little cost. Works in any direction—delivers 7,200 strokes per minute smoothly, effortlessly. Saws through 3/4" medium-hard wood at a foot-a-minute speed. Touch-of-the-trigger, foolproof action. Only 2 moving parts, never needs oiling. Uses 110-120 v. A.C.

FREE
PROJECT
PLANS

... for a
useful project
packed
with each saw

MOTO-TOOL—THE POCKET-SIZE MACHINE SHOP



MOTO-TOOL KIT NO. 2
With 23 Accessories (High
Speed Steel Cutters, Grinding
Wheels) \$23.50.
MOTO-TOOL NO. 2 (only)
with one emery wheel point
—\$16.50.

Moto-Tool is the most versatile tool you can own—grinds, routs, drills, carves, engraves, polishes, etc. Look at these features: Approx. 27,000 R.P.M. • Dynamically balanced armature eliminates vibration. Oilless (oil-sealed) bearings • Dust-filtered air-cooling system • Weighs 13 oz. • Uses 110-120 v. AC • Used in plants of General Electric, Ford, Remington Arms, Nash-Kelvinator, etc.

Don't confuse Moto-Tools and Accessories with so-called "bargain offers." Compare Dremel feature for feature with competitive tools. If our products are not superior in every way, we don't want you to buy.

Portable DRILL PRESS

Only
\$9.95

(Less
Moto-
Tool)



WHERE TO BUY DREMEL TOOLS

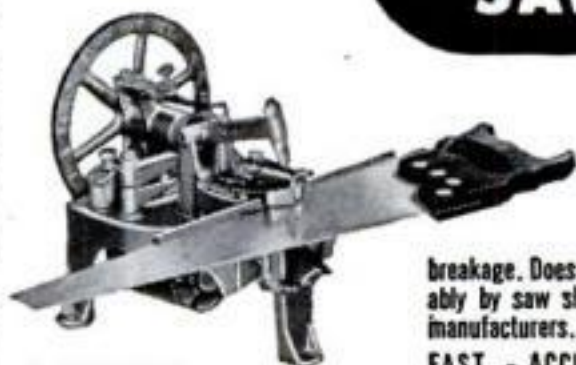


Dremel Tools are sold everywhere. If your dealer cannot supply you, send remittance in full and we will ship postpaid. Or send only \$2, and pay postman balance plus postage and fee. Money back if not delighted after 5 days' trial.

DREMEL MFG. CO., Dept. 120-G, RACINE, WIS.

BeMaCo Dependable

AUTOMATIC SAW SET



Sets 400 teeth per minute on hand or band saws 4 to 16 point. Hammer and anvil action sets teeth accurately and uniformly... No tooth breakage. Does a perfect job. Used profitably by saw shops everywhere and saw manufacturers. Every machine guaranteed!

FAST • ACCURATE • DEPENDABLE

★ INCREASES
PROFITS

BEAVER MFG. CO.

801C S. 1515 AVE. • INGLEWOOD, CALIF.

ARC WELDING FOR PROFIT OR PLEASURE

60 LBS. OF READY MADE PARTS

Only
\$24.95

BUILD YOUR OWN HEAVY DUTY WELDER

SAVE
BUY ONLY
NECESSARY
PARTS

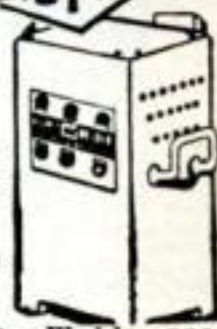
All parts Ready-Made and easy to assemble. You can do all around welding on steel, cast iron and other metals after only a few hours practice. Illustrated instruction manual included. Sold on 30 Day Money-Back Guarantee!

FREE: Write today for fully illustrated Pamphlet S-7.

ATOMIC ARC WELDER CO.

1039 So. 19th St., OMAHA, NEBR.

Gives 100% penetration. Welds are stronger than original metal. Operates on 110 or 220 AC.



PESCO HYDRAULIC PUMP



With built-in adjustable relief valve. This brand new, powerful gear-type pump is rated at 1000 PSI, 8 G.P.M. at 3750 R.P.M. Delivers up to 6 H.P. Requires 1/2 to 6 H.P. to drive directly. 1/2" drive spline and 3/4" pipe ports. Weight approximately 7 lbs. Priced at only... **\$8.95**
Discounts on quantity.

HYDRAULIC CYLINDER.

Oil or air double action. 1 1/2" bore. 4 1/2" stroke. Lift 2000#. Weight 4 1/4#. Priced at only \$4.95, when purchased with above pump, which will run one or more of these cylinders. If purchased without pump, priced at... **\$6.00**
Discount on quantity.

HIGH SPEED



MILLING CUTTERS

		SIDE MILLING CUTTERS		Quantity
		Arbor Hole	Price Ea.	
Dia.	1/8	5/8	1.20	6/\$6.00
	3/16	5/8	1.25	6/\$6.00
	3/4	1 1/4	7.00	none
		PLAIN MILLING CUTTERS		Quantity
		Arbor Hole	Price Ea.	
Dia.	1/8	5/8	1.00	none
	1/4	1	1.00	none
	1/2	1 1/4	3.50	6/\$16.00
Dia.	3/4	1 1/4	3.00	6/\$15.00
	1	1 1/4	2.95	6/\$14.00
		STAGGER TOOTH CUTTERS		Quantity
		Arbor Hole	Price Ea.	
Dia.	1/8	5/8	3.00	6/\$15.00
	1/4	1 1/4	5.95	6/\$25.00
	3/4	1 1/4	5.95	6/\$25.00

10 High Speed Morse Taper Shank Drills up to 1". New and slightly used surplus. \$40 value for only **\$6.25**

All merchandise sold with money-back guarantee of satisfaction and is shipped postpaid.

T & T TOOL, 101 West Archer, Tulsa, Oklahoma

WELD

BRAZE, SOLDER, and CUT →

ONLY \$995 F.O.B. complete!

EASILY... QUICKLY!

No experience needed. Follow simple instructions, weld on iron, steel, bronze, brass, aluminum, and other metals. Plugs into any properly wired 110 volt A.C. or D.C. line. Make or save time and money doing repair work for yourself and others. Repair men, farmers, tinmiths, home and auto owners, hobbyists, etc., say FOUR-WAY pays for itself over and over. Order today or send for Free details.

FOUR-WAY WELDER COMPANY, Dept. F3-GA
2326 So. Michigan Ave. • Chicago 16, Illinois

ORDER NOW 10 DAY TRIAL

SOUTH BEND

LATHES
DRILL PRESS
SHAPER



9" to 16-24" Lathes

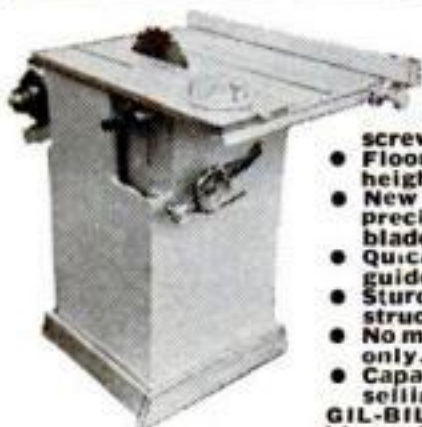
14" Drill Presses

7" Bench Shaper

Write for literature—indicate machine.

SOUTH BEND LATHE, SOUTH BEND, IND.

BUILD YOUR OWN TILTING ARBOR SAW!



- 27x28 in. table stays level. Blade tilts full 45 degrees.
- 10 in. blade cuts 3 1/4 in. deep, jack-screw depth adjustment.

SAVE \$50 OR MORE

- Floor model, 34 in. table height.
- New Departure ball bearing arbor, 3/4 in. precision shaft, ready to run, 5/8 in. bore blades.
- Quick-positioning, self-aligning rip fence guide.
- Sturdy wood, steel and aluminum construction.
- No machining—build easily with hand tools only.
- Capacity and performance of floor saws selling for \$150.00 and up!!

GIL-BILT Step-by-Step pictorial plans (No blue-print reading required), full scale pat-

terns, 11 actual photographs. **\$1.00**
GIL-BILT Metal Parts Kit includes Plans, ball-bearing arbor, cast aluminum miter gauge and bar, rip fence guide, machined lock knobs, jackscrew mechanism with 4 1/2 in. handwheel, and all other metal parts including every screw, bolt, nut and washer (less blade) **\$20.95**

Same Kit with 10" combination blade **24.90**
Same Kit with 8" combination blade **23.90**

Return Kits in 10 days for refund if not satisfied.

(Prices include postage up to 600 miles)

Also available—Plans and Metal Parts Kits for 8" Tilt/Table Saw and 12" Band Saw. Order Plans at \$1.00 each—sent postpaid anywhere in the world, or write for FREE descriptive Catalog.

GILLIOM POWER TOOLS

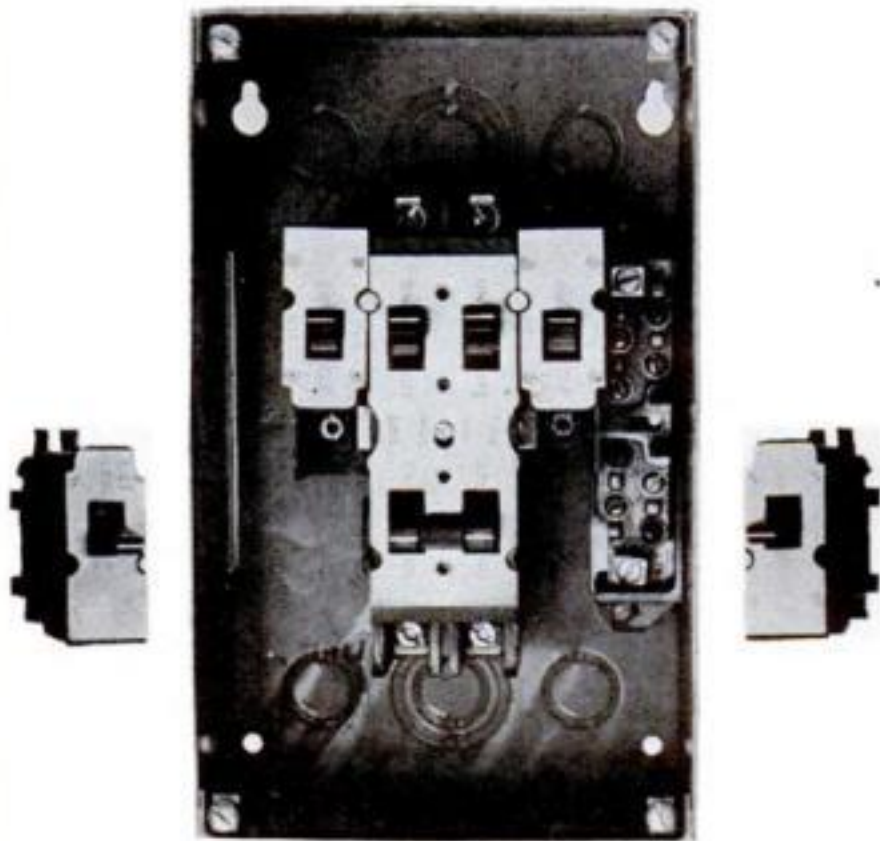
P. O. Box 1-VG, Lambert Field
St. Louis 21, Missouri

seeking further to improve their strength, which does not yet compare with that of woven cloth—no drawback, however, in uses not requiring rugged wearing qualities.

Marketed under such trade names as Masslinn, Plastavon, Steralon, Viskon, Web-ril, and Lantuck, nonwoven fabrics are finding the widest variety of applications both in the home and in commerce and industry. Among other things, they are being used for work frocks, protective clothing, bags, filters for coffee makers and for chemical processes, tea bags, buffing wheels, pipe coverings, oil-cloth backing, electrical insulation, and plastic-laminate structural materials for cars, trailers, boats, and planes.

Shoe Polish Waxes Golf Clubs

AFTER I had bought a new set of golf woods, the pro let me in on a little trick. Rub the clubs with a little shoe polish and they'll retain their original luster.—Arthur Kloth, San Francisco.



Add-on Circuit Breaker

FLEXIBLE protection for home electrical circuits is provided by the Ad-On Multi-Breaker shown above. The units combine thermal and magnetic action to open an overloaded or shorted circuit. Hundreds of combinations can be provided in the basic installation to allow for a variety of current-handling needs and additional breakers can be added at a future time. This permits the expansion of electrical circuits without alteration of the original installation. Cutler-Hammer, Inc., Milwaukee, makes the circuit breakers.

SPECIAL! Gigantic Mail Sale! Army POWER PLANTS

2500-WATT, 110-VOLT, 60-CYCLE

•Your last chance to own Army's finest power plant—at tremendous saving! Genuine PE-75, brand new, in original crate with spare parts and tools. Cost Gov't over \$600.

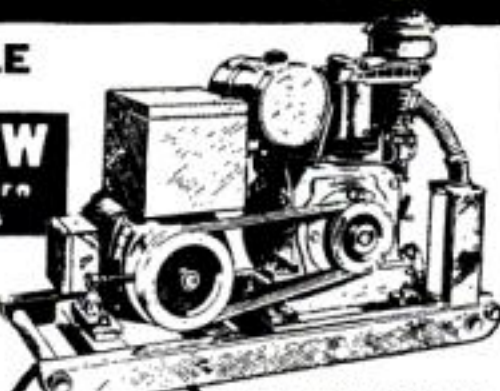
•Ideal for contractors, filling stations, cabin camps, carpenters, utilities, businesses, farmers, ranchers, etc. Use full-time or as emergency when regular lines fail—to operate lights, refrigerator, oil furnace, motor, etc.

•Will stand substantial overload. Voltage remains constant from zero to full load. Filter prevents radio noise. Comes complete—no extra equipment to buy.

SPECIFICATIONS: 2500-watt, 110-volt, 60-cycle single-phase generator. Genuine 6.5 h.p. model ZZ Briggs engine. Uses little fuel. Use engine for other purposes when not operating plant.

BRAND NEW
with original spare parts and tools

Kit contains —
gaskets, ignition parts, spark plugs, valves, rings, wrenches, wheel puller, pliers, etc.



Cost Gov't over \$600

\$269

FOB Lincoln, Nebr.

Or we'll ship Frt. Ppd. in U.S.A.

\$279

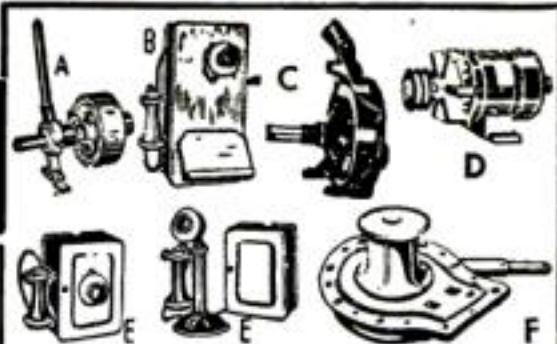
Limited number used plants excellent condition guar.

\$225

FOB Lincoln, Nebr.

\$235

Ppd. U.S.A.



OTHER ITEMS ON SALE!

- A. Utility Clutch, up to 6.5 h.p. \$13.95
- B. Magneto Rural Telephone... 12.40
- C. Centrifugal 3/4" Pump... 6.50
- D. G.E. 300-Amp. Welder... 89.90
- E. City Wall or Desk Phone... 4.99
- F. Winch, 5000-lb. Cost \$150 21.95
- G. Army Field Telephone... 11.95

We Pay All Shipping Charges

- Other power plant bargains including 750-watt, 3000-watt and 6300-watt sizes. Also generators, alone. Write!
- Dozens electronic, mechanical, power tool bargains. Write!
- Order from ad. Satisfaction guaranteed. Or send card for complete bargain catalog.

BURDEN SALES COMPANY

829 "O" St.

Lincoln, Nebr.

SAW SHARPENER



Table model, gums and sharpens rip saws, combination saws & cut-off saws. Ideal for "Skilsaw" blades. Cap. 4" to 20" diam. Complete with 1/4 h.p. motor & 1 grinding wheel & cord—\$64 f.o.b. Portland. Shipping weight, 63#. SEND FOR FREE LITERATURE.

P. T. HOBBS MACHINERY

8375 N. Interstate, Dept. 75, Portland 17, Ore.

POSTPAID ANYWHERE IN U.S.A.

WE FURNISH ALL MACHINED METAL PARTS, EVERY SCREW, NUT, BOLT, WASHER, AND COMPLETE PLANS FOR THIS...



BIG 10" POWER SAW

\$10.95

FULL REFUND IF NOT SATISFIED IN 10 DAYS

COMPLETE PLANS 10c
MARCUS-POLLAK
DEPT. C, ROYERSFORD, PA.

ASSEMBLE IT YOURSELF WITH SIMPLE HOUSEHOLD TOOLS!

NONE BETTER!

SUPER DRILL GRINDER



Sharpens round shank drills from 3/32" to 1/2" in diameter, up to 6" long. Grinds old drills like new in 4 different point angles, using hand or power grinding wheels. Money-back guarantee.

Price only \$2.95

At Dealers or Postpaid

Crandall Mfg. Co. 1512 W. Slauson, Dept. FB-49, Los Angeles 44, Calif.



BRONZE FOUNDRY

Schools and Home Workshops

Make your own castings of aluminum, copper, bronze, silver. Foundry sets are available in three sizes including 2400 Deg. F. blast Furnaces, \$22.50; \$29.50; and \$42.00. f.o.b. Kansas City. Free Circular.

KANSAS CITY SPECIALTIES CO.

P. O. BOX 6022, DEPT. S-6 KANSAS CITY, MO.

MOTOR OIL SHOULD NOT BE CHANGED!

Learn WHY! Send for FREE 32-page booklet. Mention year and make of your car, truck or tractor.

RECLAIMO MFG. CO., Inc., 5083 Elston, Dept. 35, Chicago 30, Ill.

Another of thousands of uses for VISE-GRIP WRENCH

LOCKS to work with more than Ton-Grip! Does jobs no other tool can do. Involute Jaw Curve holds all shapes. Knurled Jaw Tips hold to the very tip. Has Thin Nose, Super Wire-Cutter. With cutter—No. 7-W, 7", \$2.25. No. 10W, 10", \$2.50; Without cutter—No. 7C, 7", \$1.85. No. 10C, 10", \$2.25.



LOCKS With Ton-Grip

If not at your dealers, order direct.

PETERSEN MFG. CO., Dept. M-7

DeWitt, Nebr.

COMPLETE FLEXIBLE SHAFT MACHINE only

With Pencil-Size Handpiece for "Finger-Tip" Control

\$16.95

Performs countless tasks quickly, easily! Use FOREDOMS on wood, metal, glass, plastics, etc. Provides easy accessibility, unobstructed view. Grinds, polishes, drills, mills, engraves, sharpens, slots, sands, carves, etc., etc. Complete \$16.95. No. 50 Accessory Set \$1.50 additional. Order today. FREE CATALOG.

FOREDOM ELECTRIC CO., Dept. 1031-E, 27 Park Pl., N. Y. 7

THE BIGGEST VALUE ON THE MARKET DIRECT FACTORY TO YOU

DYNAMIC SUPER-CHARGED ARC-WELDER

DOES WELDING, BRAZING, SOLDERING, CUTTING

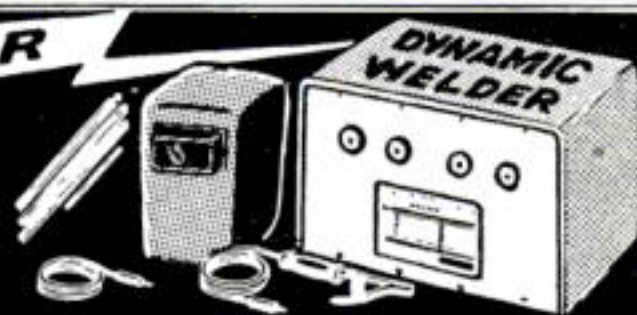
It's the finest, precision built heavy duty transformer-welder available for home, farm, or shop use. Does work you'd expect from costlier machines. EASY TO OPERATE. Do expert work; follow simple instructions. Works on iron, steel, brass, bronze, aluminum and other metals. Operates from any properly wired 110 volt 50/60 cycle AC line. Save time, Make money—Build or repair auto, home, farm or shop equipment, etc. for yourself and others in spare or full time. Comes complete Ready-To-Operate. Write today for FREE details on 10 day trial and money back guarantee.

DYNAMIC WELDER CO., Dept. D3-GA4, 15 E. 23rd St., Chicago 16, Ill.

ELECTRIC TORCH GIFT WORTH \$6.80



INCLUDED FOR PROMPT ACTION



OVER 50,000 SATISFIED USERS

FREE Complete illustrated descriptive details on WELDER and 10 day trial on MONEY BACK GUARANTEE. Write today.



Fell a tree like this in less than a minute with a McCULLOCH



New One-man POWER SAW

Finest gasoline-powered chain saw for all tree work, wood cutting, land clearing, etc. Use it to fell, buck, or rip. For trees up to 3-foot diameter. Weighs only 25 lb., develops full 3 hp. Starts instantly. Cuts in any position — take it anywhere. Send for free data.

\$295.00
f.o.b. Los Angeles

Endorsed by professional loggers everywhere

NATION-
WIDE
SALES
and
SERVICE



McCULLOCH MOTORS CORP.

6101-A West Century Boulevard
Los Angeles 45, California

SEND FOR FREE LITERATURE

RETAIL PRICE \$125.00
FACTORY TO YOU **\$59.95**

SUPERSHOP includes precision-built 8" tilting table saw, vertical and horizontal drill press, 30" lathe, sander, grinder. 100% BALL BEARING. Write for FREE catalog, full details, trial plan.

POWER TOOLS, INC.

213 Yates Avenue
Beloit Wisconsin



DELTA-CRAFT® PATTERNS and PLANS for woodworking hobby fun!

Clear, detailed, shop-tested. Large-scale size makes construction easy. Write for price list.

POWER TOOL DIVISION
ROCKWELL MANUFACTURING CO.
804G E. Vienna Ave., Milwaukee 1, Wis.



Write for free catalog describing complete line of SHOPMASTER Tools

SHOPMASTER, INC.

1214 Third St. S., Minneapolis, Minn.

QUALITY POWER MOWERS FOR LESS

Make-Your-Own Rotary POWER MOWER THIS IS NOT A KIT

ATLAS KEEN MOWERS

But A Complete Mower Assembled as Illustrated
MODEL 50M Just add electric motor or gas engine. Concealed 18" blade for safety. 3 Cutting heights. Ball bearing wheels.

← **Model 50GM** with 2½ H.P. McCullough gas engine **\$99.50**
Model 50E with ½ H.P. electric motor, 75 ft. cord **\$69.50**

America's Greatest Power Mower Values Fully Guaranteed

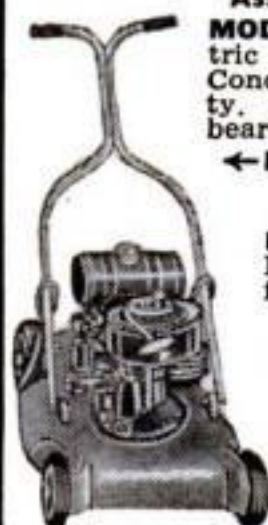
Order Model Desired NOW!
F.O.B., K. C. Send check or M.O.

ATLAS EQUIPMENT CO.

229 S.W. Blvd.

Dept. P57

Kansas City, Mo.



ONLY **\$39.95**



MACHINE SHOP EQUIPMENT

• The No. 49 edition of the famous Center Tool Co. Catalog is now ready! Every workshop owner should have a copy. 240 pages full of illustrations, descriptions, and prices of the latest tools made by best known manufacturers in U.S. You pay the cost of printing—50c. We refund your 50c with your first order of \$10.00 or more. Prompt delivery on most tools. Send check or money order today!

CENTER TOOL CO.

153 Centre Street, Dept. D, New York 13

SAFE JIG SAW

SYNCRON
ELECTRIC

READY—basic tool for Dad's workshop yet so safe small children may use! Cuts ANY length ½" wood, thin metal, plastic. Stroke easily adjustable. No oiling, gears, belts. With BUILT-IN MOTOR, 3 blades, cord, plug \$17.50 at dealers or postpaid from SYNCRON Corp., Dept. G-70, Oxford, Michigan.



HAND SCREW CLAMPS

You make the wooden jaws from simple drawing we supply with all other parts, and save up to one-half. Make 8 to 14 inch clamps from same set of hardware. Send \$1.85 per set, plus postage, shipping weight 2 lbs. Free literature.

WAUGH DESIGNS
Dept. 5, 3529 So. Monroe St.,
FT. WAYNE 5 INDIANA

COMPLETE 8" TILT ARBOR SAW MOVEMENT FULL BALL BEARING

TABLE STAYS LEVEL

SAVE **\$50**

BLADE TILTS TO 50°

MAKE ANY SIZE • FLOOR OR BENCH MODEL



COMPLETE MOVEMENT & PLANS*

\$22.75

PLANS ONLY 25c

\$72.75 REFUND IF NOT SATISFIED IN 10 DAYS

Write **DEPT. C, MARCUS-POLLAK**
ROYERSFORD, PA.

F.O.B. ROYERSFORD, PA. LESS GUARD

"Pays for Itself" **TERMS** as low as **\$16.50 monthly**



Earn \$150.00 to \$350.00 extra profit monthly with "simplified" welding!

With low cost Hobart equipment you can start a profitable welding business of your own. No trouble finding customers as every business using metal needs good arc welding, and that's what you get with Hobart.

HOBART BROS. CO., Box P-701, Troy, Ohio, "One of the world's largest builders of electric arc welders"

Small cash needed if you let Hobart help you. Many job shops start earning with a portable outfit you can build yourself. Others start earning at once with complete factory built units. Write for details.

Free

Complete Catalog, "How to Build Your Own Arc Welder" 10c



**EVERY ELECTRIC DRILL
A PORTABLE SAW**

9.95 compl. with 4" "HYCARBON" Blade

AT BETTER HARDWARE STORES EVERYWHERE

Pat. Pend.

ARCO SAW

ARCO SAW

ARROW METAL PRODUCTS CO.

DEPT. PS-7, 140 WEST BROADWAY, NEW YORK 13, N. Y.

CAN BE USED WITH ONE HAND
Any 1/4" or 3/8" Drill a Powerful Saw in ONE MINUTE

"ARCO-SAW" is a rugged tool with right angle gear drive (no clumsy, dangerous, direct drive with drill sideways). Works like a high priced Portable Saw.

CUTS 1-3/16", or 2 x 4 by turning over

ONLY ARCO GIVES YOU ALL THESE FEATURES: Safety-yoke assures rigid connection and absolute safety—Big handle affords firm grip for two-hand operation—Precision one-piece gear box—Self-lubricating lifetime bearings—Wide shoe-plate for straight, square cuts.

90-day Factory Guarantee
Hycarbon" Replacement Blade (Crosscut) **\$1.60**

ORDER TODAY at your dealer or send us check or M.O. (Postpaid). C.O.D.'s—postage extra.

UNCONDITIONAL 10-DAY MONEY BACK GUARANTEE

DEALERS—Write for nearest jobber.

Electrical CABLE AND CORD

1. #10 Flex. Lacq. Braid Automotive Wire... .021 1/2/ft.
2. #14-3/c Flex. all Rubber Cord... .09/ft.
3. #1-2/c Flex. All Rubber Cord (can be used underground)... .19/ft.
4. #10-3/c Underground Cable... .15/ft.
5. #8-2/c Underground Cable... .14/ft.

Many other constructions available. All orders sent pre-paid. Mail check or money order. Money back guarantee.

PIERCE CABLE COMPANY

2662 Clybourn Avenue Chicago 14, Illinois

HANDY CALCULATOR FOR WOODWORKERS.. ONLY 10c

Just set dial, quickly solves countless problems. Converts linear to board feet, compares workability of various woods, shows bit sizes, nail specifications. Also tool sharpening tips, etc. 6" diameter heavily varnished cardboard. Send 10c to Greenlee Tool Co. 2127 Columbia Av., Rockford, Ill.

GREENLEE HANDY CALCULATOR

5 Basic Tools, \$39.95

EMRICK 5-in-1 MACHINE includes everything listed at right (1/2 HP motor, motor pulley, V belt, and 7" saw blade only \$18.63 extra) With an Emrick you can Turn, Drill, Saw, Grind and Sand. You can handle big jobs—work in wood, metals, plastics. 10-Day FREE trial. **MONEY-BACK Guarantee.** Time Pay Plan. Write for FREE literature and see how YOU save up to \$200 on a Complete Workshop. **EMRICK, Inc.,** in Kalamazoo, Michigan at 1536 Clinton Ave.

- 1 30" LATHE
- 2 DRILL PRESS
- 3 SAW-8" CAP.
- 4 GRINDER
- 5 SANDER

EMRICK 5-in-ONE

NEW TRIPLE WINDOW CONVERTIBLE TOP

\$125.00 Value! Comes Complete Nothing Else to Buy. \$49.95

Triple Vision Rear Window Folds Down With Top!

For Buick, Cadillac, Chevrolet, Chrysler, DeSoto, Dodge, Ford & Mercury, Olds., Plymouth, Pontiac, 1941-50. Packard & Studebaker, 1946-50.

Be Sure to Specify Make, Year & Model, Black or Tan Material.

Rear window plus corner windows made of Crystal Clear Flexible Plastic—Blind spots reduced to minimum for greater safety. Convertible owners can drive with top up—enjoy more vision than most closed cars. Top is of durable 3 ply waterproof material with rubber for longer wear & lasting beauty. Rear curtain has Zippers.

Send 25% Cash With All Orders, Balance C.O.D.

JUST OUT! Get the largest Auto Accessory & Parts Catalog in the world. Over fifteen thousand items, including Hollywood Accessories, Hi-Speed Equipment, Rebuilt Engines, all parts & accessories for all cars & trucks. We have that Hard-to-Get-Part! Completely illustrated. Jam packed with bargains. Send 25c.

J. C. WHITNEY & CO.

1917-P ARCHER AVE. CHICAGO 16, ILL.

The JIFFY metal CABINET

YOUR ANSWER TO SMALL ITEMS STORAGE at home, office, and shop (IDEAL GIFT, TOO)

So handy to keep nuts, bolts, screws, nails, parts, washers, stamps, hobbyists' needs, etc., at your fingertips.

THIS 32 DRAWER UNIT ONLY \$8.95 POSTPAID

Stop searching, get a 32 or 64 drawer Jiffy to keep those small items that usually get mislaid. Spot welded steel, gray enamel finish, metal drawer guides. Dividers included with aluminum drawers make possible three compartments per drawer. Looks good anywhere. Send check or money order, please—no C. O. D.'s. Prices below. Your money refunded if not satisfied. Dealers write for quantity discount.

SPECIFICATIONS

32 Drawer Unit
6" Deep
12 3/4" Wide
15 1/4" High

64 Drawer Unit
6" Deep
25 1/2" Wide
15 1/4" High

Drawer Size
1 1/4" Deep
2 3/4" Wide
4" Long

WITH ALUMINUM DRAWERS
Dividers and Index Cards Included

One piece rustproof aluminum drawers for heavy service—good for work bench and industry use.

32 drawer - \$8.95
64 drawer - \$15.95

Ohio orders add 3% sales tax.
Marproof Rubber Feet included with all cabinets

NEW SPECIAL! ONLY \$2.95

8 DRAWER UNIT (24 compartments)
16 DRAWER UNIT (48 compartments) **\$4.95**

Specifications
6" Deep, 8 1/4" High
8 Drawer 6 3/4" Wide
16 Drawer 12 3/4" Wide

POSTAGE PAID | POSTAGE PAID

KAYTEE PRODUCTS, Dept. S, Box 588, Canton, O.

NEW USES for your HOME POWER TOOLS!

Just off the press—our 1950 tool catalog, chockfull of new ideas to make your power tools more useful! Time-saving, power-driven tools you've never seen before—for sawing, sanding, polishing, grinding, routing, mortising, woodshaping, etc. If you own an electric drill, drill press, circle saw, or lathe, send for this valuable book today. Every tool illustrated. Send 10c to cover postage and handling.

BERTRUM H. ENGINEERING CO.

3121 MAIN STREET KANSAS CITY, MO.

HYDRAULIC Power Transmission

WITH Infinitely VARIABLE SPEEDS, Clutch and INSTANT REVERSE

OUTPUT TORQUE ADJUSTMENT UP TO 180 inch POUNDS

FINGER TIP CONTROL

This positive displacement Hydraulic Torque Converter is the ideal fluid drive with thousands of uses. Output Speeds Infinite .0 to 550 R.P.M. in either direction. Change Speeds WHILE RUNNING. Control and Transmit your power this SMOOTH Oil-Way. Will handle 1/4 H.P. to 1 1/2 H.P. Motor. Industrial or Home & Farm Use. Cost Government \$300. High Quality Precision Workmanship. Buy this unit to get the most for your money. Case measures 7 1/2" long 7" high 6 1/2" wide. Input & Output Shafts 5/8" dia. Beautiful Red Crackle Finish Case.

Shipping Wght. 25 pounds

Only \$54.50

Prepaid in U.S.A.
2 quarts oil included FREE

If C.O.D. is requested a 10% Deposit must accompany order and we ship F.O.B. Chicago.

1 1/2"-8 thread Lathe Chuck Adapter, \$3 extra

DIRZIUS MACHINE SHOP "P" 1423-25 So. 52nd Ave., Cicero 50, Ill.

DON'T FOOL WITH YOUR EYES "The Best is NONE too GOOD!!!"



Genuine
U.S. AIR
CORPS
**SUN
GLASSES**

Here is the Real McCoy. 6 Base - finest quality Glare-Free Calibar lenses, optically ground and polished. Has gold plated adjustable frame with Pearlized sweat bar and nose pads. Handsome, genuine leather case is designed to attach to your belt. These fine glasses are made to meet and surpass the most rigid government specifications. Don't miss this amazing value. Protect your eyes from glare. Wear these smartly styled, official Army sun glasses. A \$12.50 Value. **3 95**

SAVE A LIFE! MAYBE YOUR OWN!

STOP HEADLIGHT
GLARE with ...
**NIGHT DRIVING
Glasses**



Here are the World's finest Night Driving Glasses. With 57 mm yellow amber, 6 Base lenses. These are the finest quality optical glass. Ground and Polished to reduce glare of oncoming headlights. Also made to sharpen "object focus" more clearly at night. A tremendous aid to safe night driving. Has plated frames, Pearlized sweat bar and nose pads and genuine leather case. **4 29**

ND-1 A \$15.00 Value. **3 95**
ND-1B CLIP-ON Style. To attach to your glasses. \$12.00 Value

Aviators (AN-6530)
Windproof & Dustproof
GENUINE GOGGLES
Rubber or chamois covered frame. Clear or Green GROUND LENSES are interchangeable. Adjustable nose bar. Ideal for Flying, motorcycling, etc. **1.69**

GO-1 GOGGLE KIT
NEW! U.S. Navy - Has soft sponge rubber frame. 4 Polaroid lenses 2 green, 1 red, 1 clear. Perfect for racing, cycling, etc. **89¢**

WATCH BARGAIN
Here's a real Shock Absorbing watch. Has jewel movement, Sweep second hand, luminous dial, chrome case. Guaranteed for one year. Ideal for young and old. **6 95** PLUS 10% TAX

NEW NAVY WATCHES - Just received from Navy Ships Service surplus. Famous 17 jewel Swiss makes. All shock absorbing, anti-magnetic and waterproof. Stainless steel case. **13 95** PLUS 10% FED. TAX

17 JEWEL Chronograph. One of the finest made anywhere. Cased in Switzerland. Sweep second hand, stop and re-set buttons. Measures distance, airspeed, ground-speed, races. Ideal for the sportsman. **21 95** PLUS TAX

OCEAN CITY FISHING REEL
There's good fishin' with our No. 306 FLY REEL for casting in lakes and streams. **1 25**

Paratroop BOOTS
Here is the ideal boot for hunters, campers, hikers and for workmen needing a sturdy, durable boot for long wear. Has top grade leather, 12" upper, reinforced stitching in arch, extra heavy leather sole with genuine Cats Paw half-sole and heel. **6 95**

PALLEY SUPPLY COMPANY
6321 SAN FERNANDO RD.
Dept. PS7 GLENDALE 1, CALIF.

100% WOOL SLEEPING BAG
Trips to the mountains and beaches will not be complete without this Mummy Type sleeping bag. 100% wool lined with zipper. Lightweight and easy to pack. **3 95**

Used water repellent cover sold only with above. **1 95**

NAVY EMERGENCY RATIONS
Seamen, hunters, campers, scouts carry these Navy emergency ration packets. Contains Bouillon powder, Halazone to purify water, Antiseptic, matches and drinking flask, as well as numerous other food and emergency items. **1 29**



BUOYANT
LIGHT WEIGHT
WATERPROOF

NEW NAVY WADING SUITS

Brand new Wading Suits, answer to the sportsman's dream - Ideal for surf or deep stream fishing. Used every day on ranches, oil fields, and work where it is necessary to protect the body and clothes from moisture, silt, muck, etc. Made of rubberized canvas with vulcanized seams, it keeps you absolutely dry. Has built in rubber gloves, with 1/2 length rubber boots. Air tight buoyancy pockets inside for balance in deep water. 100% waterproof liner.

Sizes: Small, Medium and large. **Only 6 95**

U.S. ARMY PUP TENTS



VACATION SPECIAL! For that summer or fall camping trip - to the mountain or seashore. Perfect for hunters. Made of heavy army duck, 42" high, base space 5 1/2 x 8 1/2 feet. Wt. 5 lbs.

USED PERFECT 5 95

NAVY HAT HEADNET

Here is the Navy's famous Hat-Headnet. Designed for protection against sun and wind burn; for use against insect pests. Ideal for beekeepers, farmers, vacationists. Full protection for head, face, neck, and shoulders. Made of khaki colored poplin, with heavy mosquito netting material.



View at left shows wind and sunshield in position.

Only \$1 29



U.S. AIR CORPS RUBBER BOATS

Another necessary item for your summer or fall vacation. These AAF rubber boats have been fully reconditioned and are ready for immediate use. Comes complete with carrying case. Safe and lightweight. For fishing or fun.



1 MAN **1 695** (with OARS) 2 MAN **2 495** 5 MAN **2 995**
7 MAN **4 250** PUMP **2 95** OARS **2 95**



"MAE WEST" Pneumatic LIFE JACKET

A MUST for the Fisherman, or Boat Owner. Why Take a Chance? BE SAFE! Can be inflated by mouth or sparklette bottle charge. Extra CO₂ Charges 2 for 25¢. **2 49**



DIVING MASK

There's fun, thrills, excitement in exploring beneath the surface of the sea, the bottoms of rivers and lakes, when you can see these sights with your own eyes. Use this soft rubber diving mask with the big heavy duty glass eyepiece. Adjustable head band. Comes in 3 sizes.

Jr. 4 1/2" **1 59** Miss 5" **1 69** Mr. 5 1/2" **2 95**

SWIM FLIPPERS

For fun and frolic in the water, there is nothing better than Swim Flippers. Made with top quality rubber. Has pebble tread bottom, adjustable heel strap. Vented for air and drainage. **5 95** PAIR

FISHING SPEAR

Just the thing for fishing in ocean, streams and lakes. Corrosion resistant, 11" long, with barbed end. Diameter of socket 1". Get it! Use it! **39¢**

DIVING UNIT

Study life under water! Fish and explore ocean depths with this divers unit. Complete with air supply tank, regulator and hose. Can be used for dives down to 25 ft. depth. Will stand 400 to 500 P.S.I. with enough air supply for approximately 12 to 15 minutes per dive. **5 95** DV-1



G-1 Air STORAGE TANK - A days supply for your diving unit. 12 1/2" x 24". 500 lbs. pressure. **4 75**
This stainless steel tank can be used on Beach or carried in luggage compartment of car.



AIR TANK HOSE
This hose is used to tap G-1 storage tank. To refill DV-1 Diving Unit Tank. **Only 1 59**

SEE OPPOSITE PAGE FOR ORDERING INSTRUCTIONS

SAVE UP TO 85% IN WAR SURPLUS from "GADGETEERS" HEAVEN

ANTENNA REEL

Just the thing for tuning beam antenna. Powered by 1/8 H.P. 24v G. E. Motor. Removable 6" Reel-limit Switch - Cam Worm gears, Bevel gear, Solenoid clutch. Motor engaged to gear reduction only when electrical contact made. Operates in either direction. Ideal for auxiliary power take-off, opening and closing doors, etc.

#711 **429**

MICROPHONE

Telephone type - Highly Sensitive with excellent, clear tone. This was the Signal Corps favorite. An ideal instrument for the radio 'ham' and professional recording studio, broadcasting, home recording, public address, etc. A Sensational Buy! Complete with cord and plug. . . . ONLY

229

NAVY PHONE SETS

Used by the Navy for Flight Deck & Gunnery Control. Each set is complete with 2 phones on chestplate, 2 headsets, button switches & 35 ft. of cable. SET IS FULLY SOUND POWERED & can be successfully used up to 1/2 mile distance without battery. Ideal for home-to-garage, house-to-barn, office-to-shop, etc. Worth many times our price. Set of two . . . Same as above with 2 flashlight batteries for power. Set of two . . .

7.95

7.25

16 POCKET VEST

Sturdy, Yet Light Wt. Satin Lined with Tie Straps, 14 Outside Pockets, Plus Knife, gun, or Tool, Leather Holder, 2 large 11" x 8" Pockets. Inside, Wonderful Hunting, Fishing, or Mechanic. A Steel

\$2.49

HUNTING KNIFE

6" polished vanadium blade handle, leather grip, In leather sheath. \$5.98 Value for ONLY

1.69

1.49

BOLO KNIFE

10" x 2" Parkerized blade. 5" Gripped Handle. Weight 1 1/2 lbs. . . . Ideal for Hunting, Clearing Brush or Trails. With Case

1.19

COMPASSES

No. 152 - MATCHBOX Jewel & Floating dial. . . . 39c
No. 153 - JEWEL Watch pocket . . . 1.59
NEW!!
No. 154 - WRIST STRAP type. . . . 69c
No. 155 - Navy POCKET CARD TYPE . . . 89c

MESS TRAY

6 Compartment - Stainless Steel - Rustproof. Wonderful for Outdoor Serving, Barbecue etc. Saves dish washing. Ideal for use in the home, hospital, 'roughing'. 311A - Used but in excellent, Serviceable Condition.

79c

PALLEY SUPPLY CO

6321 SAN FERNANDO RD.
DEPT. PS7 GLENDALE 1, CALIF



16 mm MOVIE CAMERA

Has semi-telephoto 1 3/8" (35mm) lens with yellow filter - 3 shutter speeds: for normal (16 frames) semi-slow motion (32 frames) and slow motion (64 frames per second). Uses any standard Eastman film magazine or Type 'G' AAF magazine. Takes Black & White or Full Color pictures. Operates on 24V (dry cell batteries) & requires slight conversion for hand use. Diagram furnished. Cost Gov't \$235.00. NOW, \$24.50
CONVERTED GUN CAMERA - Fully reconditioned with start switch on front. Choice of finishes - Grey, Black, Blue. . . . \$33.95

Sleeping Bags



MUMMY BAG

Has outer cover of forest green, water repellent balloon cloth. Filled with 15% Duck Down and 85% Chicken Feathers. 1/4 length zipper. Size 34" x 84". . . . 12.95

KAPOK BAG

Here's real warmth and comfort. Has special water-repellent, olive green, heavy duty cover. Filled with 4 lbs. of 100% imported Kapok. Stays soft - will not mat down. 3/4 length zipper. Head flap makes dust cover when rolled. Full length mattress pocket. Size 34" x 77". . . . 13.50



PARACHUTES (CANOPY)

Ideal for shirts, Lingerie, Blouses, Car Covers etc. Each canopy is 24 ft. diam. approx. 50 sq.yds..

RAYON

9.95

NYLON

14.95

NYLON FISHLINE Special

Strong - Lightweight - 2 ply NYLON FISHING LINE. ROT-PROOF and WATERPROOF . . . Especially treated for strength and long life. ON SPOOLS.

25 lb. test, 1000 ft. green \$1.59
50 lb. test, 400 ft. green. . . 1.19
72 lb. test, Braided, Black with Grey, 300 ft. . . 3.49
100 lb. test, 300 ft. white. . . 3.79



FOAM RUBBER

Molded & pre-shaped. Can be cut to fit your Chair seat, Boat, Auto, Truck or Trailer Seats. Ideal for all Sports Events.

4 1/2" x 18" x 22" . . . \$5.65
4" x 18" x 22" x 23" . . . \$4.95
4 1/2" x 15" x 16" . . . \$4.95
25" x 62" x 1 1/2" . . . \$6.45
25" x 65" x 2" . . . \$8.45
25" x 65" x 1 1/2" . . . \$7.45



LEATHERETTE

to cover Chairs, Patio Furniture Nooks, Auto Seats, etc. 10 colors at a BARGAIN PRICE.

WIDTH COLORS (per yard) PRICE
36" Grey, Brown, Black \$1.19
36" Lt. Green, Dark Green, Blue . . . 1.65
54" Red, Grey, Lt. Blue, Ivory Yellow . . . 1.89

Name Brand PLASTIC LEATHERETTE

Waterproof, Heat Resistant plastic covering. In Yellow - Chinese Red, Green, Grey, Chartreuse, Brown Yacht Blue, 54" Width. ONLY 1.95



RADIO HEADSET

Low Impedance. Ideal for amateur radio, crystal sets, or professional use. Adjustable ear phones. Used and in excellent condition. . . . 1.59

HS-300 - Two Magnetic Type receivers

in watertight brass case. Soft rubber inserts in each receiver to fit into wearers' ear. Pliable steel head band. Ideal for communications, divers, workers in noisy compartments, etc. NEW 1.59



Loose Leaf BINDER

3 metal post. Cylindrical locking heavy duty 3/16" fabricated hinged cover. End identification window. Ideal for price books, salesmen catalogues, photo albums, students, publications, Reference books, etc. Will hold 500 sheets, 8" x 11". 59c ea



CLAMP-ON ANYWHERE LAMP

With adjustable ball and socket swivel head, long rubber covered cord and wall plug. The All Purpose Lamp. Wonderful for Indoor Photography, Floodlights, Baby Spot or Large Spot, Personal Bed Reading, Workbench, Garage, etc. Lamp Alone Highly Polished 9" diameter Parabolic Reflector or 5" diameter Spot Reflector at Only 85c ea.

LARGEST FIRM OF ITS TYPE IN THE WORLD



U.S. NAVY INSULATED OFFICER FOOD CONTAINER

Why bother cooking on that trip? This lightweight plastic Thermal Food Container holds enough hot, fresh food for 8 people. Has 2-5 qt. removable Pyrex Baking Dishes for meat, veg., or liquids, 1-9 qt. Plastic container for ice, etc. Each section individual - Case of sturdy plastic with carrying handle. 10.95

OPEN CLOSED

NEW TARPS - HEAVY CANVAS

Mildew & Flame Resistant. Cheap Outside Storage. They are Really Moving at These Prices.
5' x 7' \$3.95
8 1/2' x 10' \$8.50
16' x 32' \$39.95
16' x 22' \$29.95
Rubberized Linen
7' x 11' NEW \$5.95
Only 3 lb. light weight yet waterproof. Ideal for outside car storage.



PLEXI DOME

Overall length 21" - Width at widest point 11" - at base 4". 6" deep. For Fish & Flower Bowls - Car Roof - Lights. 1.89

Plexiglass contains 2 lbs. plexiglass & Lucite sheet in various shapes. 1 oz. bottle of clearset cement, and 5 bottles of colors in Orchid, Red, Yellow, Peach, etc. Also a Plastic Handbook of uses & instructions. This set easily worth \$5.50. Our Price . . . \$2.19

Plexiglass & Nascelite clear plastic shts.

NASCOLITE - Full sheets app. 1/8" x 37 1/2" x 49 1/2", app. 10 1/2 lbs. each \$12.50



GOOSENECK LAMP

Consists of 24 volt control box with dimmer switch, 18" flexible extension & frosted glass shade. Can be used on 110 volt current. 2.49



NAVIGATORS LAMP

A handy light for desk, work bench, chart table, engine room, etc. Can be used on 6-12-24-110 V by changing bulb. 3 ft. shaft has 4 joints to adjust position. . . . ONLY \$2.95



NAVY Sealed Beam LAMP

U.S. Navy Portable Pistol Grip light. Has sealed beam and aiming sight. Ideal for search, spot or Emergency light on auto, boat, farm etc. . . . 2.95
12 Volt light, 4" lens . . . 3.49
24 Volt, 5" lens & carry case . . . 994
Set of 3 filters, Red, Grn, Amber (specify type lamp)

92 PAGE CATALOG

War Surplus - Tools, Machinery, Raw Materials, Clothing, etc. Illustrated with valuable info., tables, charts & data. Send 25c to cover handling & postage.

TANKS TO YOU!!

TANK Made of Dural. Has welded seams, 2" filler with cap, and two standard pipe ports for hook-up. Visible liquid level gauge on one side. An ideal tank for Gas, Oil, Water or as a 'spare' on your auto, tractor, truck, boat or plane. Sturdy - Lightweight. 4.95



NEW TANK

Aluminum tanks for auto, boat, trucks. Holds 19 gallons, weight 17 pounds. Size 18" x 13" x 25". Complete with Filler Cap. ONLY . . . 6.95



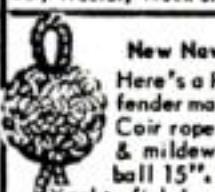
Jeep WATER TANK

Every motorist, boat owner should have one. Made of heavy gauge steel, screw top, porcelain lined. 5 gal. Only 2.45



New SUN VISOR

Made of clear gun plastic. Adjustable arm & swivel head. Holds firmly. Can be swung in any direction. Made for the Air Corp. Very useful on your Car, Tractor, Truck or Boat. SPECIAL 1.29



New Navy Boat Fender

Here's a Real Buy! Ball type fender made of special woven Coir rope in India. Rotproof & mildew resistant. Size of ball 15". Ideal for Yachts, fish boats & tugs. 2.95



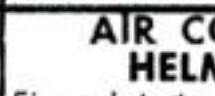
AIR CORPS BRIEF CASE

This is a genuine piece of AAF equipment. Made of best grade Brown Leather in a handsome Pebble finish with a light canvas liner. Has two full length map or paper compartments and three smaller pockets. An ideal case for students, salesmen, artists, etc. Full heavy duty zipper closure. 12" x 16". Shpg. Wt. 3 lbs. ONLY 2.95



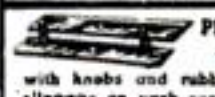
AAF CASE

Genuine top grade leather. Multi-compartment. Lock and Straps. Ideal for Artists, Students, Salesmen, etc. Used, good condition. . . . 7.95



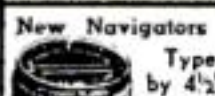
AIR CORPS HELMET

Fine grade leather - Chamolite lined with chin cup on strap. Intermediate weight - Ideal for summer wear. NEW ONLY . . . 1.59



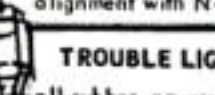
PLASTIC PARALLEL STRAIGHT EDGE

with knobs and rubber pads for non slippage on work section. A must for navigators, mechanics, draftsmen, and engineers. . . . You've never seen 'em at 97c ea.



New Navigators Magnetic Compass

Type D-12 - Size 7" dia. by 4 1/2" deep. Rubber lined rotating verge range ring . . . calibrated in 1° from 0-360°. 2 parallel grid wires for alignment with N-S line. \$14.95



TROUBLE LIGHT

With heavy duty reflector guard, all-rubber covered socket with built-in switch and female outlet. NEW With 25 ft. extension cord. . . \$2.29 With 50 ft. extension cord. . . \$3.09 EXTENSION CORD - 18-2 rubber covered. Complete with male & female plugs. 25 ft. 1.49 50 ft. 2.49

Order from this Ad. All sales final. All Prices F. O. B. Glendale. Pay by M.O. or Check. P.O.'s Acctd. from D & B. firms. 1/2 deposit with C.O.D.'s.

BUILD YOUR OWN COOLING FANS

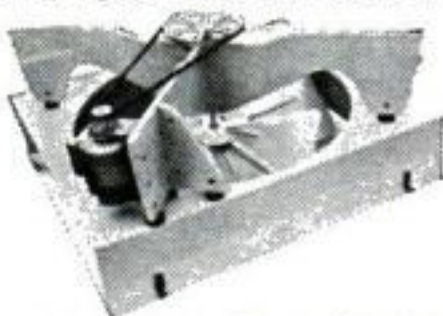
EXCLUSIVE GIL-BILT BUILD-IT-YOURSELF FEATURES

- Engineered for home construction by world's leading manufacturer of build-it-yourself power tools.
- No machine work. Build easily with hand tools only.
- No guess work. No blueprint reading. Step-by-step pictorial plans, full size patterns, actual photographs.
- Sturdy wood & plywood construction, engineered for reduced noise and vibration.

SAVE UP TO
\$50
OR MORE

GIL-BILT 36 INCH ATTIC FAN

- Molded rubber cushions minimize vibration.
- Soundproofed ball bearings, sealed against dust and dirt.
- Efficient 36 in. Torrington Steel Blade.



- Horizontal mounting makes installation easier.
- Rubber cushioned mounting brackets reduce noise.
- 9000 C.F.M. with 1/3 h.p. motor. Cools entire house.

GIL-BILT KIT #510-A Includes Plans, bearing blocks, 3/4 inch steel shaft, Torrington blade, two V-pulleys, V-belt, rubber cushions, mounting brackets, plus all necessary screws & bolts (less motor & wood for wood parts) . . . **\$25.95**
GIL-BILT Plans #510, Full Size Patterns, Installation Instructions 1.00

GIL-BILT 24 INCH WINDOW FAN

- Two heavy OILITE oilless bronze bearings
- 24 inch TORRINGTON 40 degree pitch aluminum blade
- Pedestal mount for blade and pulley simplifies construction. Shipped ready to run.
- Mounts out of way on outside of window.
- Belt driven with any 1/6 or 1/4 h.p. motor.
- Rubber cushioned mounting brackets reduce noise, simplify installation.
- 5000 C.F.M. at 620 r.p.m. cools 4 or 5 room house.



GIL-BILT KIT #520-A Includes Plans, TORRINGTON rustproof blade and V-pulley mounted ready to run on cast aluminum pedestal. V-belt, motor pulley, mounting brackets, plus all necessary screws and bolts. (less motor and wood for wood parts) . . . **\$19.95**
GIL-BILT Plans #520, Full Size Patterns . . . 50

GIL-BILT 20 INCH ROOM COOLER FAN



- Complete fan shipped ready-to-run. Cut out plywood panel and bolt to fan guard with four bolts.
- Direct drive nationally known REDMOND motor complete with cord and two-speed switch.
- Precision balanced TORRINGTON blade.
- Sturdy wire guard, rubber mounted to minimize vibration.
- 3000 Cu. Ft. of air per Min.
- Build to fit any window 24 inches wide or over.

GIL-BILT KIT #530-A. Includes Plans, all screws and bolts. Motor, blade, guard, switch, and cord shipped completely assembled ready to run (less wood panel) . . . **\$28.95**
GIL-BILT Plans #530, Full Size Patterns25
NO DEALERS—One Low Factory Price! Prices include postage within 600 miles. Over 600 miles add 5%. Send cash, check or money order for fan kit, or send for Plans now and order Kit later less cost of Plans. Write for free descriptive folder.

GILLIOM POWER TOOLS

P. O. BOX 1-VG Lambert Field St. Louis 21, Mo.



PEEL PAINT TO BARE WOOD WITH ONE EASY STROKE

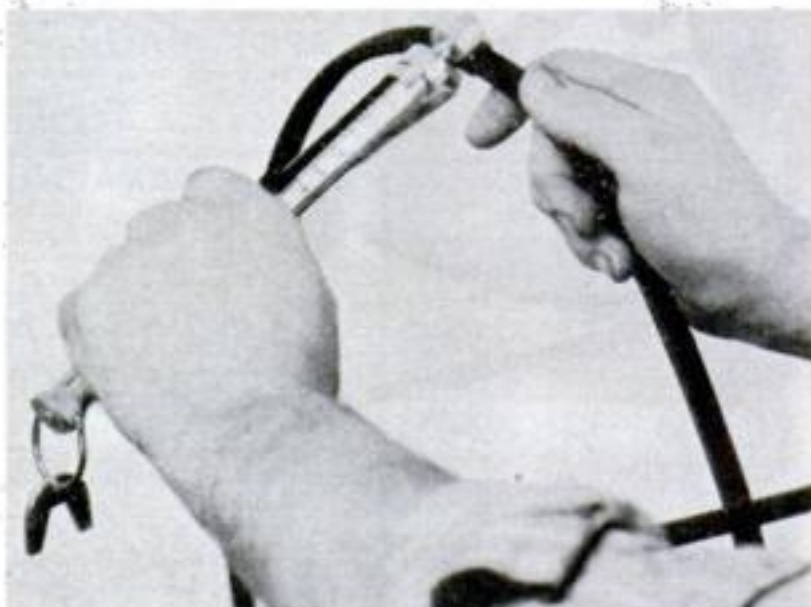
NEW ELECTRICAL TOOL removes 1 to 10 or more coats of paint from any wood surface as easy as cutting butter with a hot knife. No scraping, cutting, burning, sanding, or chemicals. The new Lectro Paint Peeler instantly softens paint electrically and peels it off the surface clean to the bare wood with one easy stroke. It's faster than a blow torch—there's no danger of fire—will not scorch or burn delicate wood surfaces. Makes no mess—no smell—it's even fun to use. Removes any paint, enamel quickly and easily. Sturdily constructed to last for years. Sent complete with extra long, quality electrical cord. Simply plug into any A.C. or D.C. outlet—let heat for several minutes and remove paint to the bare wood on exterior or interior painted surfaces, floors, woodwork, cupboards, furniture, antiques, boats, window-sills, screens, doors—a hundred other uses. Price \$4.95 postpaid—nothing else to buy. Full money back guarantee. For immediate shipment—send check, cash or money order to:

LECTRO WELD, INC.

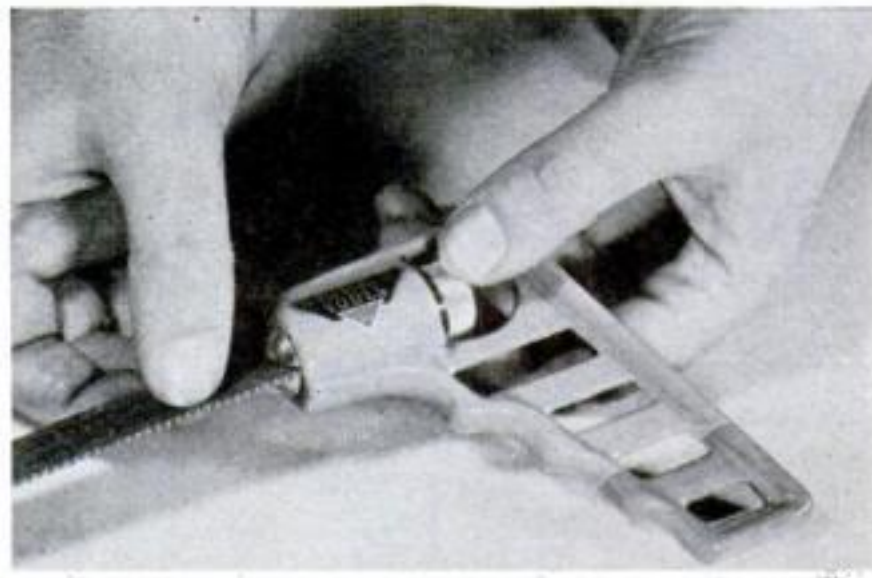
5700 Detroit Ave. Dept. PS-7 Cleveland 2, Ohio



New

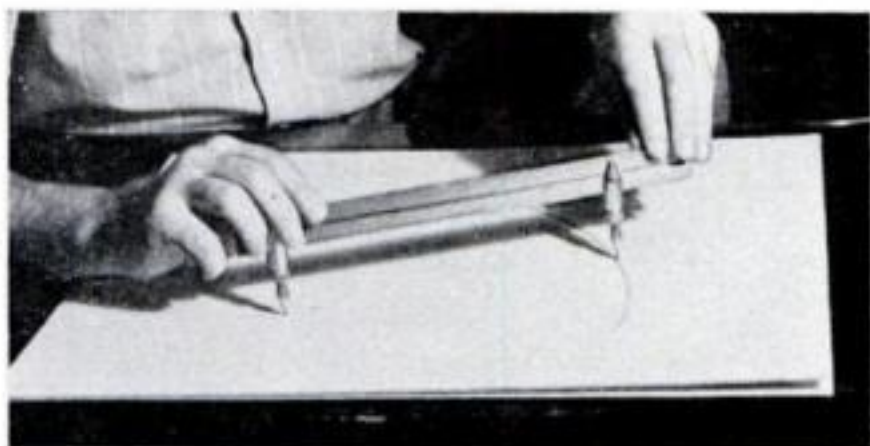


Gauge Measures V Belts. The Belt Meter, made by Goodyear Tire and Rubber Co., Inc., of Akron, Ohio, quickly determines the length of a V belt. The belt is clipped in place against a knurled knob, and is then pulled through for a full circuit. The knurled knob turns a worm gear that moves an indicator, showing the length in inches. The device takes light-duty belts.



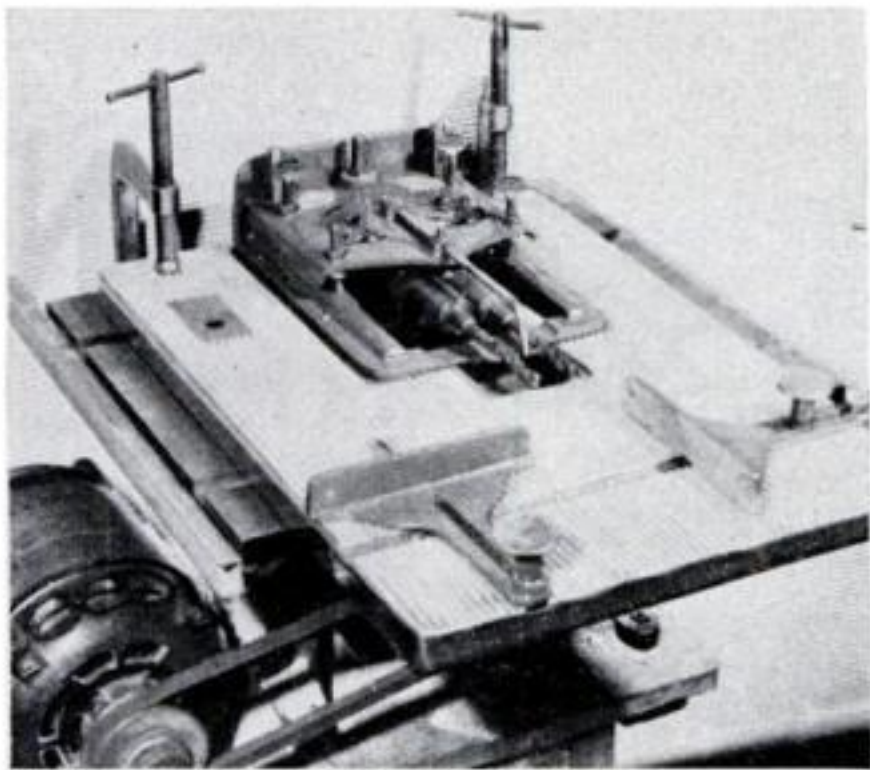
Saw Blade Is Rotatable. If you've ever skinned your knuckles using a keyhole saw in a tight spot, you'll appreciate this saw. The blade can be turned through 360° and locked in any of eight positions. If you want to cut right up to a wall, you can have the handle in the normal position while the blade's teeth are facing the wall. The tool is made by the Millers Falls Co., Greenfield, Mass. Price is \$2

Tools



Trammel Heads for Craftsmen.

When used with a combination square or steel rule, these trammel heads make an accurate compass, height gauge, inside calipers, outside calipers, or scribes. The Engineering Research Associates, of Hazel Park, Mich., manufacture the heads. Each set of heads includes scribe points, pencil tips, and special caliper points. The retail price of a set is about \$3.



Double Drill Fits Saw Table.

These twin horizontal drills for doweling jobs are belt driven by the motor of a bench saw. The saw blade is removed and the unit clamped to the table. The chucks are lined up with a pulley on the saw spindle and the belt tightened by lowering the spindle or raising the table. The drills can be adjusted up or down in relation to the table. The Hadwiger Manufacturing Company, of Pueblo, Colo., prices the multiple-drill unit at \$40.

AMAZING NEW

3 SPEED

- BUFFER
- SANDER
- POLISHER

Fits Any 1/4" Drill



Now you can buff, sand, grind and polish at exactly the right speed. Most flexible kit ever offered. New, exclusive, 2 speed right-angle drive unit gives just the right speed for every operation—double drill speed for fast, fine sanding, 1/2 drill speed for added power and high lustre polishing and buffing, direct drill speed for run-of-mine work. Light and easy to use. Swivel action between drill chuck and angle-drive unit permits use at any angle on any surface. Even an inexperienced operator can get professional results. Buffs, grinds, polishes sands car bodies, furniture, woodwork, floors, metals. For home and shop use, garages, farms, service stations, machine and cabinet shops, building maintenance and many other uses. Heavy duty steel cut Zerol gears of right angle drive operate in grease-packed, sealed chamber. Will give long, hard, smooth service. Complete kit includes:

Right angle drive 2 speed unit
Flexible molded rubber head
Direct drive adaptor, cup washer, screw
Polishing bonnet, highest grade lambs wool
Heavy-pile carpet compound rubbing pad
Three sanding discs—coarse, medium, fine grits
Full directions

Full money back guarantee. Sent postpaid anywhere in U. S.



ONLY
\$1.49
Postpaid

DIRECT DRIVE Polishing and Sanding Kit

Designed for use with any electric drill. Kit contains: Rubber head with cup washer, screw and adaptor; highest grade genuine lambs wool polishing bonnet; medium grit sanding disc. Ideal for use with chuck and drill bench mountings and for 1/4" electric drills. Operates at drill speed. Full money back guarantee. Sent postpaid anywhere in U. S.

PALM GRIP RATCHET SCREW DRIVER SET

Handiest thing yet for loosening those hard-to-get wood and metal screws. Heavy duty palm ratchet fits 3/4" standard socket in driver heads. Also fits all 3/4" standard wrench sockets. Heavy duty screw drivers have tool steel blades and tough, non-burning "Tenite" handles. 3 sizes fit every need. Practical, time saving. Designed for auto mechanics, machinists, electricians, carpenters, farmers, home craftsmen, building maintenance men, cabinet and furniture workers. Palm ratchet operates right and left with center lock. Full money back guarantee. Sent postpaid anywhere in U. S.

SEND CASH, MONEY ORDER OR CHECK with coupon today

LAKE SALES, INC.

6536 Carnegie Avenue, Cleveland 3, Ohio

Enclosed find () cash; () check; () money order for which please send me the kit checked below.

- | | |
|------------------------------|---------------|
| () Complete, 3 Speed Kit | \$7.95 |
| () Direct Drive Kit | 1.49 |
| () Ratchet Screw Driver Kit | 6.50 |

Name:

Address:

City & State:

DEALERS—SEND FOR FULL INFORMATION

Handy Power Drill Big Help in Homes!



Drills Metal,
Wood,
Plastics



Fits in
Vertical
Stand



Drives
Sanding Discs



Drives 3"
Grinding Wheel

HOME-UTILITY
1/4" Electric
DRILL
\$18.95

Saves Hours on Many Jobs!

Wouldn't you like to speed up building and repairing things around your house—finish more projects in your spare time—turn out work you can be proud of? This versatile Home-Utility 1/4" Drill is the answer! You'll be amazed at the way it helps you install household hardware and fixtures, polish silverware, wax furniture, sharpen cutlery and tools, sand down furniture, knock off old paint and rust!

Quality built by BLACK & DECKER, world's largest maker of portable electric tools, this powerful Home-Utility Drill operates on A.C. or D.C., with a handy trigger switch. It's compact, lightweight, well-balanced, shaped to fit the hand, easy for the lady of the house to operate, too! Try it at your hardware, electrical or implement dealer's. Let him show you the many attachments which make it a timesaving, work-saving appliance for your home! THE BLACK & DECKER MFG. Co., Dept. H7S, Towson 4, Md.

Products of The BLACK & DECKER Mfg. Co.

ELECTRIC
HOME-UTILITY
TOOLS



6" Saws



1/2" Drills



5" Sander-
Polishers



1/4" Drill Kits



6" Bench
Grinders

METAL REPAIRS ARE EASY

WITH

KESTER METAL MENDER
(GENUINE TIN LEAD SOLDER)

FREE "HOW TO SOLDER BOOKLET"

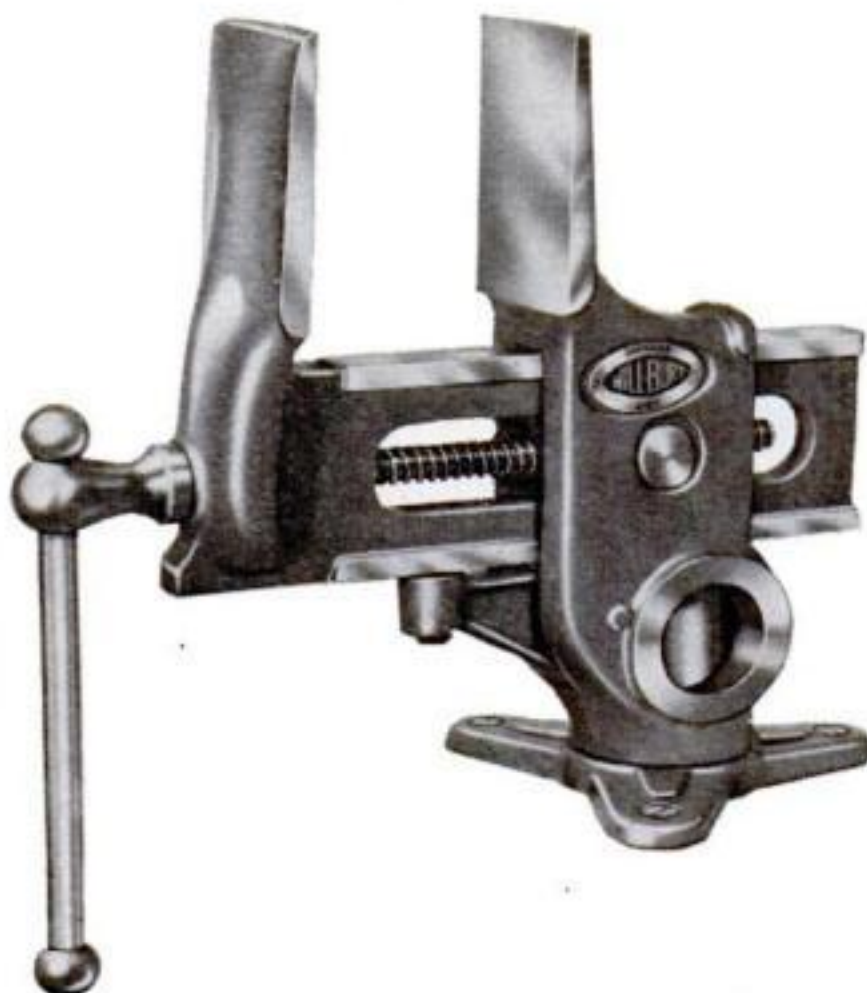
Send for yours today. "Soldering Simplified"... 16 pages crammed with instructive photographs and step-by-step explanations of how to do good soldering.



25¢ IN MOST AREAS

KESTER SOLDER COMPANY
4201 Wrightwood Ave., Chicago 39, Ill.
Newark, N. J. • Brantford, Canada

New Tools



Tightening Jaws Locks Base.

When the jaws of this woodworking vise are tightened on the work, the vise locks in position on its base, eliminating a separate adjustment. The Versa-Vise can be placed on its steel, post-type base in either the upright position shown, or horizontally on its left or right side. In any of these positions it can be swung 360°. Holding surfaces are 2 1/2" by 3 1/2" and it has a 5" capacity. The Will-Burt Company, Orrville, Ohio, prices the vise at about \$9. The tool weighs 16 lb.



Hammer Turns Screws.

Tapping this screwdriver turns a screw in or out. With the blade set in the slot of a screw, you turn the handle a little to the right or left. The hammer blows transmit through the driver a twisting motion, turning the screw with greater force than can be exerted conventionally. The tool is made by Allen & Son Manufacturing Co., of Asbury, Mass.

Speedy Sprayer

**Heavy duty all-purpose paint sprayer for
Hobbyists, Mechanics, Home Owners who
demand superior performance and results!**

SPEEDY SPRAYER 890

Delivers 2 cu. ft. per minute, now only
clean, oil-free air at 30-40 lbs.
pressure. Operated by any 1/4
h.p. motor. Never needs oiling.
Complete outfit—gun, valves,
nozzles, air hose, less motor,
\$26.50

Free

W. R. Brown Corporation
5718 Armitage Ave., Chicago 39, Ill.
Please send me free Booklet "How to Spray. Also
Speedy Sprayer literature.

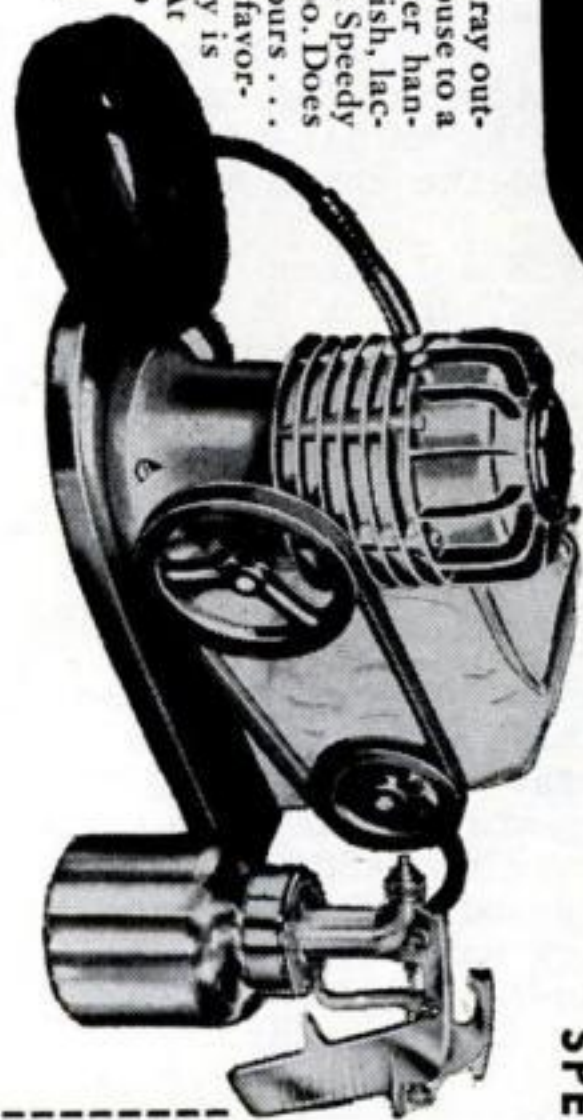
Name _____

Address _____

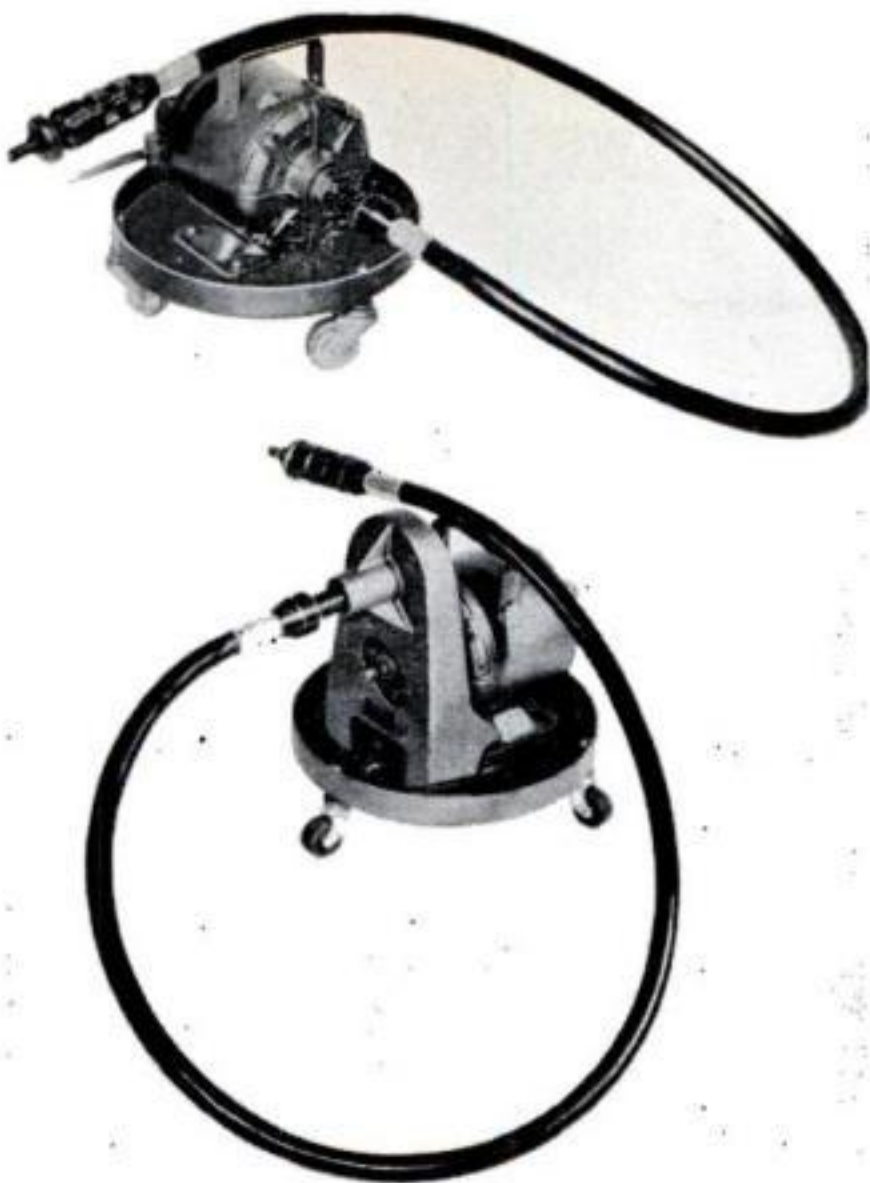
City _____

State _____

Here's a real "professional" spray outfit that paints anything from a house to a toy! In addition, Speedy Sprayer handles any material—enamel, varnish, lacquer, calcimine, insecticide, etc. Speedy Sprayer saves time and money, too. Does any job in *minutes* instead of hours... makes paint go further. It's the favorite sprayer whose dependability is proven by 20 years of usage. At hardware, paint, lumber or auto supply dealers.



W. R. BROWN CORPORATION
CHICAGO 39, ILL.
Specialists in Portable Sprayers for Over 20 Years!



Flexible-Shaft Units. Two portable power units for flexible-shaft tools—the Jiffy Tool and the Speed Jiffy—are being marketed by the Stow Manufacturing Co., Binghamton, N. Y. The Jiffy delivers 1,750 r.p.m. from a 1/4-, 1/2-, or 1/2-hp. motor. For more demanding operations, the other model offers three speed variations—1,000, 1,750, or 3,000 r.p.m. These speeds are obtained by altering the plug-in position of the flexible drive shaft. Both units are mounted on casters and have 5' shafts.



Drill Becomes Hammer. Any 1/4" electric drill can be converted to a hammer for drilling masonry with this adapter made by the Roto-Power Corp., Brooklyn, N. Y. The tool also can be used for auto-body or fender work. It's priced at \$10.75, including the handle. Attachments are available for calking, peening, and riveting.

P.S.

Last minute news & notes...

AUTO NEWS: Chrome is being tried in places where it doesn't show. Tests indicate that the life of auto piston rings can be prolonged and cylinder wear reduced by using hard chrome plating on the top ring in each cylinder. . . . Packard is using walnut shells now in making Ultramatic drives. They're ground like coffee and used to blast burrs off of the machined surface of castings. . . . With a new compressor kit made in Britain, you can use your car's engine to blow up a tire. It can be done without stopping the car, moreover, by clipping an air-tight universal joint to the wheel hub.

FOR SEASICKNESS and other types of motion sickness, dramamine is the best bet, New York University doctors report after a study of the effectiveness of a number of the commonly used drugs. It seems to decrease the sensitivity of the body's balance mechanism to the motion of ships, swings, cars, and airplanes.

SURFACTANT is a new word worth knowing. It means a 'surface-active agent.' Surfactants are being used as wetting agents, to disperse grease or solid particles, and to keep fine powders suspended in liquids and lotions. They may make the familiar label, 'Shake Well Before Using,' obsolete some of these days.

RUSSIAN TELEVISION images are being broadcast with a definition of 625 lines, according to Soviet newspapers. Standard is 525 lines in U.S., 405 in Britain, and 819 in France. But the screens of the latest model of Russian receiving sets are only about the size of an American 7-inch screen. . . . U.S. Bureau of Standards, meanwhile, reports it has picked up radio signals sent clear around the world. They were received about .14 of a second after they left the transmitter. On a stormy day they were delayed less than on a normal day.

YOUR DOG can be better protected

against rabies with a new vaccine produced from virus grown in chick embryos. Lederle Laboratories experts claim its development will prove to be the greatest step taken towards elimination of rabies as a fatal disease since Pasteur first immunized dogs in 1885.

ATOMS, once supposed to be indivisible, have now been found to contain at least 12 and maybe 13 different kinds of particles. But some don't live long. M.I.T. physicists, for example, have found that the average heavy meson disintegrates in 60 millionths of a second.

NEW PRODUCTS: A plastic, non-metallic sheathed cable made by Plastic Wire & Cable Co., Jewett City, Conn., promises to make home wiring easier. . . . Nu-Way Signal Co., Chicago, is making a door mat that will ring a bell when stepped on. . . . Silicones have been put into a new waterproofing solution by Stop-all, Inc., Kalamazoo, Mich., to help home owners keep basements dry.

GRASS GROWS SLOWER, without being harmed, if sprayed with the correct amount of a weed killer called maleic hydrazide. U.S. Rubber Co.'s experimenters are working with it. They've found that it will also inhibit the growth of shrubbery--and kill off crab grass. But it is not on the market yet, and they insist you may have to wait quite a while before using it in place of your lawn mower and hedge shears.

THERMOMETER made at Yale detects changes in temperature as small as a ten-millionth of a degree. . . . Goodyear Tire experts have developed a waterproof fabric through which body vapor (they mean sweat) can escape. . . . McKee Glass Co., Jeanette, Pa., offers bird houses made of thick, opaque glass in red, green, yellow, or brown.

The Editors

This One



HE73-ASR-OKLY

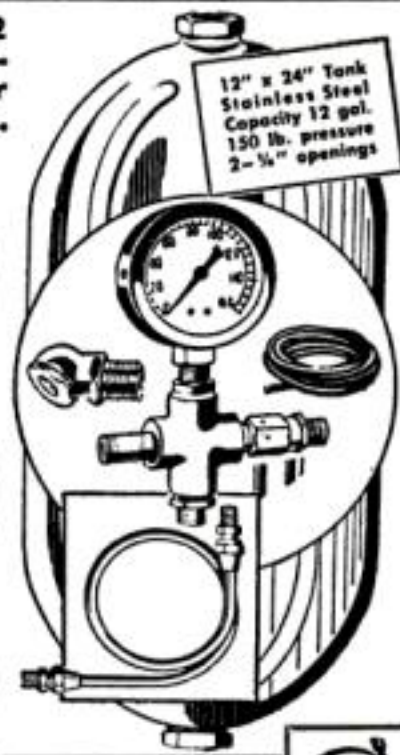
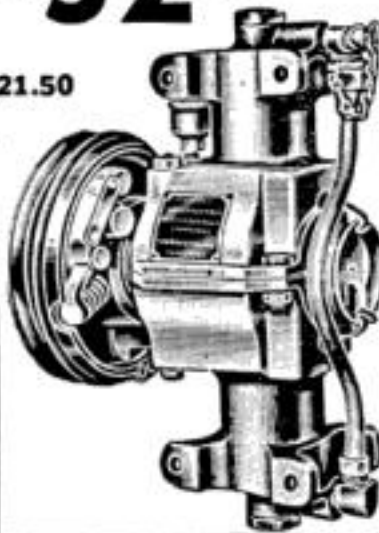
"Wellworth" Sensational Offer! Reg. \$60.50 WESTINGHOUSE AIR COMPRESSOR

Compressor, pressure tank, air gauge, air chuck, 20-ft. hose, pop valve, copper tubing with 4 brass flared fittings for connecting compressor to tank, 4-way cross and 3 nipples. COMPLETE OUTFIT, wt. 52 lbs.

Equipment less Compressor, \$12.50. Compressor separately, \$21.50. Compressor has 2" bore, 1 1/2" stroke, ball bearing, 3.27 CFM at 600 R.P.M. Capacity up to 6.54 CFM. Size 9"x11 1/2"x6 1/2". Wt. 26 lbs. Ideal for spraying paints, insecticides, etc., inflating tires, operating air tools, and other uses. All new equipment. U.S. government surplus. Replacement parts available. Amazing buy. Don't miss it.

Model T-1 Brand New — 2 CYLINDER PISTON TYPE. Operates with 1/2 H.P. Motor or equivalent gas engine.

\$32.50



12" x 24" Tank
Stainless Steel
Capacity 12 gal.
150 lb. pressure
2-1/4" openings

ELECTRIC LIGHT and POWER PLANT Same as high power line GASOLINE DRIVEN

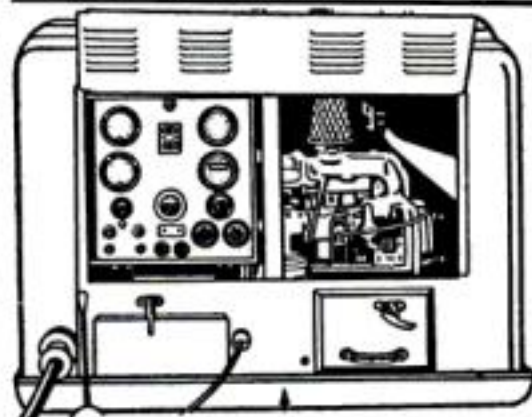
Advantageous purchase from U. S. government enables us to offer this great bargain. Ideal for farms, homes, garages, shops, etc. Will operate oil burner, deep freeze units, compressors, saw, pumps, radio and sound systems and general lighting.

SPECIFICATIONS: 115 Volts, single phase 2500 watt, A.C., 60 cycle with 25% reserve power. ENGINE: Briggs & Stratton, Air Cooled, 6 1/2 H.P. LELAND GENERATOR. "V" Belt drive with guard, and Duplex Receptacle plug-in. NET WT. 310 lbs. Shipping Wt. 440 lbs. Brand New! Complete with spare parts, tools, instructions. Fully Guaranteed.

MODEL PE 75. Mfrs. List Price \$700.00. OUR SPECIAL BARGAIN PRICE.....



Only **\$295**



LIGHT PLANT REMOTE CONTROL

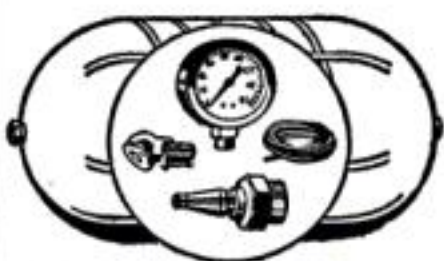
All Brand New Equipment

A fortunate purchase of U. S. Gov. surplus permits us to offer you this opportunity of a lifetime.

GENERATOR: 5,000 watts, 52 amps. 110-120 volt, 60 cycles, 1 phase A.C. with 25% overload, K.V.A. 6.3. ENGINE: 4 cyl. Hercules, 14 h.p. at 1800 r.p.m. Complete panel board, 100 ft. remote control cable, 100 ft. #6 rubber-covered heavy duty cable. Spare parts and tools furnished with unit.

Shipping wt. 1200 lbs. \$1500.00 value. **\$495.00**

AIR TANK and ACCESSORIES



Air receiver, stainless steel, 12 1/2"x24". 400 lb. test. Ideal for carrying on trucks, autos and wherever compressed air is needed. Equipped with 500 lb. air gauge, tire chuck, 3 ft. high-test air hose, air inflation valve with core for retaining pressure in tank, and fittings. Two 1 1/4" openings. Complete outfit... **\$7.95**
Shipping wt. 20 lbs. Same unit but with 6" x 24" tank... **\$6.95**

"WELLWORTH" V-BELT CLUTCH



Takes starting load off engines or motors. When speed is reached, a flip of handle shifts clutch from idling to driving position. Handles "A" belts, 2.35" pitch diameter, 3/8" bore. Ideal for use with lawn mowers, garden tractors, home workshop motors, etc. 3 1/4" long. Satisfies to mount, sealed bronze bearings, positive action. Shpg. wt. 3 lbs. **\$7.50**

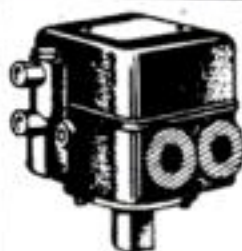
Used—Like New!

Chicago Pneumatic Riveter & Chipping Hammer. CP4X Pistol grip handle. Takes up to 3/16" rivet. Weight 6 lbs. List price \$73.00. Ideal for work on fenders and auto bodies.

SPECIAL PRICE... **\$8.95**
Same as above, brand new **\$22.50**

Ingersoll Rand or Chicago Pneumatic AIR DRILL. Used—like new. Lever or Pistol type. With 1/4" Jacob Chuck. Wt. 2 lbs. List price \$35.00. Only... **\$14.95**

SEND FOR OUR 68 PAGE BOOK. A handy buyer's guide for home and factory workshop. Bargains in motors, air compressors, electric tools, and many more items. Send 10c for postage and handling.



AUTOMATIC PRESSURE SWITCH

For Air or Water

20 to 40 lbs. **\$5.50**
75 to 100 lbs. **7.50**
125 to 150 lbs. with unloader **10.25**
1/4" check valve. **2.75**
1/4" regulator and gauge **5.75**

Prices f.o.b. Chicago. Immediate delivery. All items sold on money back guarantee. Send check or money order today.

WELLWORTH TRADING CO.
1831 STATE ST. DEPT. B-7 CHICAGO 16, ILL.

Save Time!!! Save Money!!! SEND FOR THIS BIG, NEW Woodworkers Catalog No. 17

ONLY **15c** New low prices...great selection of fine domestic and imported woods...bargains in hard to get supplies--144 pages of items and ideas for woodworkers. Quick delivery on mahogany, walnut, maple, cherry, poplar, oak, red cedar, and others properly seasoned, kiln dried. Send 15c for your copy--TODAY.

Dept. B-7

RAFTSMAN WOOD SERVICE CO.

2729 S. MARY STREET • CHICAGO 8, ILLINOIS

USUAL PRICE



7x50—\$30
Illustrated
Ht. 7 in.
Wt. 36 oz.

7x50 BINOCULARS

With COATED LENSES and PRISMS

Precision Optics **\$30***
BRAND NEW

Highest optical performance. Over twice the light transmitting power of any 8x40, 10x50, 7x35 or 6x30, three times that of any 8x30, and eight times that of any 6x15 binocular. Fully corrected, needle sharp achromatic optics with wide angle of view. Lifetime aluminum alloy construction, leather covered.

OUTPERFORMS BINOCULARS COSTING OVER \$100
*20% Fed. Tax — Money Back Guarantee — We Pay Postage
BROWNSCOPE CO. Dept. 7P, 24 W. 45th St. NEW YORK 19, N. Y.



"Pays for Itself"
TERMS
as low as
\$11.00
monthly

A full size welder...

This transformer type A.C. Welder is no plaything. It's built to turn out finest quality welding on light or heavy metals at top speed. Features "Saturated Reactor," wide welding range, Remote Control, low operating cost.

HOBART

HOBART BROTHERS CO., Box P-70 TROY, OHIO, U.S.A.

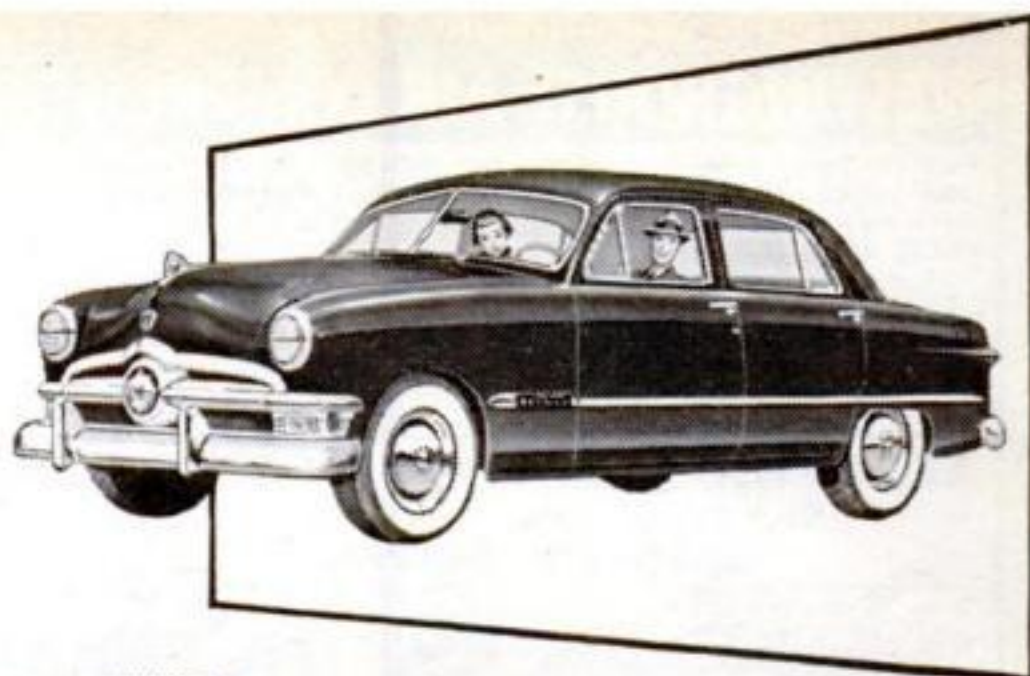
"Big Pay" jobs await you... Work flows in soon as you are properly equipped to do arc welding. Demand grows fast because you save customers money, yet make a nice profit yourself on every job. Depression-proof—offers more security.

Write today
Get literature and complete information
Free!

"One of the world's largest builders of arc welders."



IN A CLASS BY ITSELF...



the '50 FORD

for Beauty
and Brawn

YES, Ford is such an admired beauty that once again, for the second straight year, it has been chosen "Fashion Car of the Year" by the Fashion Academy of New York!

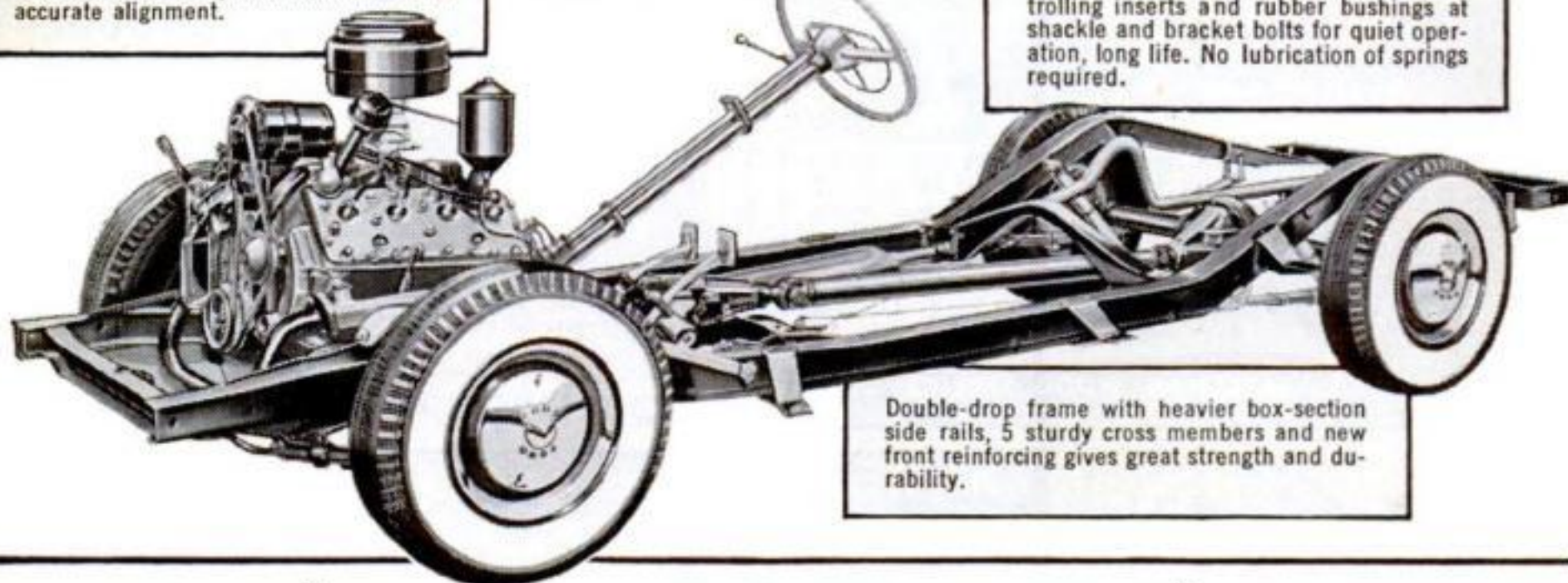
But here's a case where beauty is much more than skin-deep. Here's a brawny traveller that's built to take it—with your choice of two great economy engines . . . 100-h.p. V-8 or 95-h.p. Six. What's more . . .

Ford is an all-around economy car—low in first cost . . . low in operating cost . . . low in maintenance cost . . . high in resale value.

Completely integrated chassis design—balanced spring rates . . . correct braking effort distribution . . . low center of gravity . . . easy, positive steering control—gives big car roadability.

Heavy upper and lower control arms, mounted on an extra large front suspension cross member, hold front wheels in accurate alignment.

"Para-Flex" rear springs have ride-controlling inserts and rubber bushings at shackle and bracket bolts for quiet operation, long life. No lubrication of springs required.



Double-drop frame with heavier box-section side rails, 5 sturdy cross members and new front reinforcing gives great strength and durability.

NOW... "Test Drive" a '50 Ford AT YOUR FORD DEALER'S



"Why don't you try to put
Some weight on?"

"Aw, I guess I was just
'naturally-born' skinny!"

BUNK!

NOBODY IS JUST
"Naturally"

SKINNY!

Give Me 15 Minutes A Day And I'll Prove YOU CAN BE A NEW MAN

WOULD you believe it? I was once a skinny 97-pound weakling. People used to laugh at my spindly build. I was ashamed to strip for sports or for swim. Girls snickered at me behind my back. Folks said I was just "naturally-born skinny!"

Then I discovered my marvelous new muscle-building system—"Dynamic Tension." And it turned me into such a complete specimen of MANHOOD that today I hold the title, THE WORLD'S MOST PERFECTLY DEVELOPED MAN."

WHAT'S MY SECRET

When you look in the mirror and see a healthy, husky, strapping fellow

ARE YOU

Skinny and
run down?
Always tired?
Nervous?
Lacking in
Confidence?
Constipated?
Suffering from
bad breath?
**WHAT TO
DO ABOUT
IT is told in
my free book!**

"Dynamic Tension" is the easy, NATURAL method that you can practice in the privacy of your own room—JUST 15 MINUTES EACH DAY—while your scrawny chest and shoulder muscles begin to swell . . . those spindly arms and legs of yours bulge . . . and your whole body starts to feel full of zip, ambition, self-confidence, and new energy!

I can broaden your shoulders, strengthen your back, develop your whole muscular system *inside and outside!* I can add inches to your chest, give you a viselike grip, shoot new strength into your old backbone. I can help you cram your body so full of pep, vigor and red-blooded vitality that you won't feel there's even "standing room" left for weakness and that lazy feeling! Before I get through with you I'll have your whole frame "measured" to a nice new beautiful suit of muscle!

READ WHAT "DYNAMIC TENSION" HAS DONE FOR OTHERS

Feels Like A New Man—
"My chest has gained over 5 inches, arms more than 2 inches. My nervous troubles have vanished and constipation is a thing of the past. I have gained ten pounds and feel like a new man."—G.T.F., Ohio.

Feels Great To Be Strong
—"In four weeks I have increased 3½ inches on my chest and half an inch on my neck, 3-inches on arm, 2-inches on forearm, 1-inch on wrist. It feels great to be strong."—R.G., R. I.

Has Perfect Build—"I'm now in the pink of condition. As I was getting into my gym suit the other day, I heard a couple of men say, 'Look at that fellow. He has a perfect build.' They said my muscles didn't bulge out on me but they were well placed."—E.M., Conn.

smiling back at you—then you'll be astonished at how fast "Dynamic Tension" GETS RESULTS!

"Dynamic Tension" Builds You NATURALLY

Thousands of other fellows are becoming marvelous physical specimens—my way. I give you no gadgets or contraptions to fool with. You simply utilize the dormant muscle-power in your own body. In a very short time, you'll watch it grow and multiply into real, solid, rippling, *live muscle.*

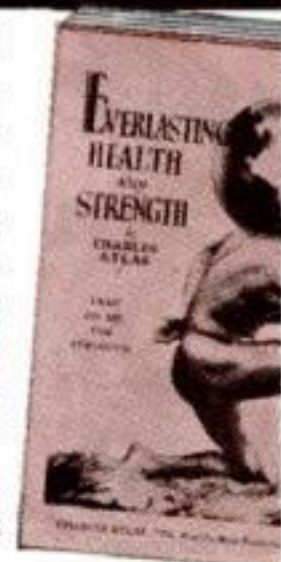
My Illustrated Book is Yours—Not for \$1.00 or 10¢—But

NO STAMP NEEDED—I Even Pay the Postage for the Postcard!

Send NOW for my famous book, "Everlasting Health and Strength." It has 48 pages, and is packed from cover to cover with actual photographs and valuable advice. It shows what "Dynamic Tension" can do, answers many questions that may be puzzling you. Page by page it shows what I can do for YOU.

Yes, this book is a real prize

for any fellow who wants a better build. Yet it doesn't cost you a penny—I'll send you a copy absolutely FREE. Just glancing through it will open your eyes. In fact, it may be the turning point in your whole life! So don't put it off another minute. Send the postcard to me personally: CHARLES ATLAS, Dept. 17, 115 East 23rd Street, New York 10, N. Y.



You'll Be **FIRST** with a
MERCURY Hurricane!



KIEKHAEFER

MERCURY

"SUPER 10" Hurricane

Want the outboarding thrill of your life? Put a new MERCURY "Super 10" Hurricane on a good hull, crack the throttle, and you'll get it!

Open 'er up and you'll know why this job is called the "Hurricane." Never before such power and speed, such ease of control . . . yet the fishermen love it for its slow, steady troll . . . it lugs their big boats faster, gives them more time for fishing. Truly the most versatile outboard ever built. See it at your dealer . . . Now!

See the complete MERCURY line for 1950 . . . the outboards with all the features that are really important, *right down the line.*

For the First Time, These New Features in a "10".

NEW "HI-REV" micro-mounted connecting rods of drop forged chrome nickel moly steel, heat treated, hardened, tempered, precision ground and micro-honed to just the right scientific finish.

NEW Improved Porting to permit easier flow of fuel and gases.

NEW Drop Forged Unbreakable Aluminum Clamp and Swivel Brackets, heat treated to the strength of steel.

NEW High RPM Magneto — NEW 8 Reed Valve Cage — Larger Crankcase Opening. Features by the score for the finest outboarding you ever enjoyed!



Full Jeweled Power
Ball and Roller Bearings
Throughout for easier
starts, more performance
per horsepower,
greater operating
efficiency, longer
trouble-free life.

Write for
FREE FOLDER

"RIGHT DOWN THE LINE".
KIEKHAEFER CORPORATION
Fond du Lac, Wisconsin, U. S. A.

Features of MERCURY Outboard Motors
are protected by issued or pending patents.